The Journal of the International College of Surgeons

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Primary Gastroduodenal Resection for Acute Perforating Peptic Ulcer

FORTUNATO S. GUERRERO, M.D., F.P.C.S., F.I.C.S.
MANILA, P. I.

THE SUBJECT of this paper is one that may arouse controversy. I am aware of the strong condemnation among my colleagues in the United States, Canada and in the British Isles of any treatment more drastic than simple closure of the acute perforation complicating peptic ulcer. I do not even suggest, much less recommend, that resection should be a routine procedure. I shall try to point out, however, that resection has its value in specially selected cases of peptic ulcer. The time has come to consider a change of attitude. Hundreds of cases are accumulating in which the much lower mortality rates and the superior immediate and long-range results among large numbers of patients are certainly convincing.

Expressive of the strong condemnation of the employment of procedures more radical than simple closure in the management of the acute perforated peptic ulcer are the unequivocal statements of Roscoe R. Graham and Hamilton Bailey. Graham, writing in 1944 with Tovee, repeated "heartily" what he said in effect in 1936 and again in 1937: "Accepting the philosophy that we have no responsibility except to save the patient's life, we are spared any debate as to whether we should do a concomitant gastrojejunostomy, pyloroplasty, or gastric resection. None of these procedures is necessary to save the patient's life. We cannot too heartily condemn all procedures save simple closure as the operation for acute perforation."

With equal emphasis Bailey has stated: "Partial gastrectomy for perforated peptic ulcer is practiced by some continental surgeons, who can produce statistics which make my mortality figures appear stupendous. It is my endeavor to keep an open mind on methods I have not tried; on this occasion I feel justified in condemning this practice wholeheartedly. I could bring many arguments to support this attitude, but this is not the place [illegible]. Let it suffice that not a few patients remain perfectly well after simple suture; that partial gastrectomy, even in the most expert hands, is an operation bristling with incidental complications, many of which can be forestalled by proper preoperative treatment; that if a patient is well enough to undergo a formidable surgical procedure, how can he possibly fail to respond to closure of the perforation and await reasonable necessity for further surgical measures?"

The following quotation from Marshall and Keleher represents the general attitude in the United States:

"Any form of surgical intervention should be designed only to close the perforation, to stop peritoneal contamination from leaking gastric contents, and should be concerned chiefly with saving the patient's life by the simplest possible procedure. Any surgical procedure designed to accomplish a permanent cure of the peptic ulcer by the removal of the ulcer by gastrojejunostomy or by subtotal resection of the stomach is plainly *contraindicated.*"

Since the ideas expressed in these quotations are generally accepted by British and American surgeons, it is not surprising that gastric resection for acute perforated peptic ulcer is only occasionally employed in this country and in the British Commonwealth. In 1940, DeBakey made an exhaustive statistical analysis and review of the literature. He collected, in the United States for the decade 1928 to 1939, 4,451 operative cases of acute perforated peptic ulcer. Of this total, simple closure or simple closure plus gastro-enterostomy was performed in 4,400; in only 45 cases was gastric resection performed. In 1942, McNealy and Howser, in their series of 673 operative cases, reported only 2 cases of resection; in the remainder palliative operations were done, the great majority being simple closures. Canadian and English surgeons are even more conservative. They employ simple closure almost exclusively, condemning resection. This conservative attitude is exemplified by recent writings of Graham, Bailey, Wakeley, Raw, etc.

In contrast to the attitude of surgeons in the English speaking countries continental European surgeons follow a more radical course. Since von Haberer advocated this radical course of treatment in 1919 gastric resection is done by German, Russian, Austrian and Italian surgeons in all but the "poor risk cases" of acute perforation with an almost unbelievably low rate of mortality. Judine, because of his connection with the Central Emergency Hospital in Moscow has been favored by the most extensive personal experience in the management of this aspect of the ulcer problem. All emergency patients from a metropolitan area of over 3,500,000 population (1937) go to this hospital. He reported in 1937 a series of 426 cases, in 419 of which operation was performed. In the latter group there were 331 gastric resections with 26 deaths or a mortality rate of 7.8 per cent. Simple closure or simple closure combined with gastroenterostomy was employed in 87 cases with 28 deaths (mortality 32.2 per cent). The overall mortality rate for this series was 12.8 per cent. In 1939 the same author reported a much larger series—937 cases of resection with a mortality rate of 8.9 per cent whereas the mortality rate in 435 cases of simple closure and simple closure plus gastrojejunostomy was 31.7 per cent. The overall mortality of this series was 15 per cent. Several authors cited by Bisgard have reported mortality rates under 14 per cent. Rates better than those of Judine are encountered in the literature. In a series of 20 cases reported by Odelberg there was a 5 per cent mortality. A collected series of resections reported by Graves also resulted in a mortality rate of 5 per cent. Mulleder and Neuberger reported 21 cases of partial gastrectomy with 4.8 per cent mortality. Strauss and Bobbio reported 8 cases and 29 cases respectively, with no deaths. In the present series there were 12 cases of gastric resection without a death.

Mortality rates for simple closure vary considerably. A maximum of 52 per cent was reported by Parker and a minimum of 1.9 per cent by Graham. The latter figure was increased to 6.3 per cent when Graham later reported 114 cases in which his former 51 cases were included. Striking an average between the two extremes of Parker and Graham are the figures reported by Nesbit and Palleta. Nesbit has reported 30.3 per cent mortality in 33 cases of simple suture, Palleta, 22.7 per cent in 44 cases similarly managed. In 612 cases of simple closure McNealy and Howser noted a mortality of 27.4 per cent. These authors estimated 24 to 27 per cent as the present mortality rate for simple closure. DeBakey observed a collective mortality rate of 25.9 per cent in 5,589 cases. A few unusually low figures (below 6 per cent) in small series of cases are cited by Bisgard.

DeBakey collected from the literature 2,392 cases of acute perforated peptic ulcer with primary partial gastrectomy. Three hundred and twenty one of the patients died a mortality rate of 13.4 per cent. This figure is only about half of the 25.9 per cent mortality in the 5,589 similarly collected cases of simple closure. An incontrovertible way to prove that partial gastrectomy has a much lower mortality rate than simple closure is to compare the total mortalities of serial groups favoring resection and serial groups favoring simple closure. Let us take the fairly large series of McNealy and Howser, for example, and compare it with the 1937 series of Judine and the recent series of Bobbio. McNealy and Howser's series has only two primary gastric resections so this group is partial to simple closure, and is representative of the general run of cases in this country. In this series there are 552 cases with simple closure, 53 with closure plus gastroenterostomy, 6 with pyloroplasty and 2 with gastric resection. The total or overall mortality given by the authors is approximately 27 per cent. This figure is more than twice the 12.8 per cent total mortality rate of Judine in his 1937 series, cited earlier in this paper. The overall mortality of Bobbio is also much lower than that of McNealy and Howser. The former collected 211 cases from three clinics in Turin, Italy, with 25 deaths, or a total mortality rate of 11.3 per cent. In all of these sources the great majority of patients underwent partial gastrectomy, and the small minority simple closure or simple closure with gastroenterostomy.

Not only are mortality figures for gastric resection much lower than those for simple closure, but the immediate and late results of resection are superior. The large collective series of DeBakey (resection) shows 90.6 per cent good or fair results and 9.4 per cent bad. On the other hand, simple closure produced 65 per cent good or fair results, 35 per cent bad results and 16.9 per cent results that required subsequent operation. Harrison and Cooper reported that 82.5 per cent of their patients showed recurrence of ulcer symptoms after simple closure of the ulcer perforation. Parker reported that 33 per cent of "suture cases," when followed up, needed subsequent operation. Follow-up reports in small series of cases cited by Bisgard from Paul, Marine, and Odelberg gave 100, 100, and 87 per cent of satisfactory results, respectively.

Strauss was the first American surgeon to advocate openly the performance of primary gastroduodenal resection for acute perforated peptic ulcer. In 1944 he reported a series of 12 cases, in 8 of which he had performed resection without any mortality. Three of the 4 patients with palliative closures died. In concluding his paper, he remarked: "Therefore, it can be safely said that in selected cases primary resection for perforated gastroduodenal ulcers offers the patient a cure of this disease; it saves him further ulcer treatment and a second operation. It removes the danger of another perforation and it does not increase the operative mortality above that of the simple suture. It does not add to his morbidity. He is soon on an unrestricted diet. It should supersede routine suturing for younger patients in good condition."

The following year Bisgard, of Omaha, Nebraska, also advocated primary resection for acute perforations complicating cancer of the stomach and peptic ulcer. He reported 6 cases of such perforation in which he did emergency gastroduodenal resection "either as the opera[illegible] choice or as definitely imperative."

I [illegible] reporting a series of 42 consecutive [illegible] perforated peptic ulcer. Twenty- [illegible] patients were treated by simple [illegible] 2 [illegible] closure plus gastrojejunos- [illegible] 12 [illegible] gastroduodenal re- [illegible] emphasize the point [illegible] 71.4 per cent of these patients were treated by conservative operations (simple closure or simple closure plus gastrojejunostomy), while less than one-third (28.4 per cent) underwent radical gastric resection. There were 5 deaths (17.8 per cent mortality) in the 28 cases of simple closure. No death was recorded in the 2 cases of simple closure plus gastrojejunostomy and in the 12 cases of gastroduodenectomy. The over-all mortality for the series was 11.9 per cent.

Instead of reciting the history of each case of resection, a brief résumé of the important data is given:

There were 10 men and 2 women. The men were from 19 to 41 years old, the majority between 25 and 35. The two women were the oldest in the group, 56 and 58 respectively. Ten had histories of ulcer varying from two years' to many years' duration. Two had suggestive histories of ulcer of three years' and two and one-half years' duration. Eight had perforation of twelve hours' duration or less before operation; and 4 had perforation of fifteen, sixteen, twenty-four, and twenty-six hours' duration, respectively. The newest perforation was of six hours' duration, the oldest of twenty-six.

Perforation was located on the anterior wall of the first portion of the duodenum in 11 cases and on the anterior wall of the antrum of the stomach in the remaining case. The classic Reichel-Polya operation was performed in all cases, posterior in 10 and anterior in the remaining two. In each of the women (the oldest patients in the group) approximately one-half of the stomach was resected, whereas in the remaining 10 patients who were much younger, no less than two thirds of the stomach was removed. Hospitalization ranged from twelve to twenty-two days. One patient had a moderately severe wound infection which was the cause of the longest hospital confinement; otherwise, recovery was uneventful in all cases.

Immediate good results were observed in all cases, all patients being relieved completely of their ulcer symptoms after the operation. On their returning to a normal diet soon afterward, improvement in general health was rapid and satisfactory. Seven patients, seen recently, four to five years after the operation, have never had any recurrence of ulcer symptoms and are in good health.

In both female patients there was only minimal soiling of the peritoneal cavity. Both were in strong condition when first examined and were considered good risks despite their age. One had an enormous amount of air in the peritoneal cavity, which caused the abdomen to deflate like a balloon when the peritoneum was opened. A preoperative diagnosis of intestinal obstruction was made in her case. In all the remaining cases there was more or less diffuse soiling of the general peritoneal cavity, but all of the patients were strong and considered good risks for resection.

It should be strongly emphasized, however, that patients for resection should be carefully selected. If they are, the risk of resection should not be more than that of simple closure in similarly selected patients, and the mortality rate should approach the low level associated with selective resection for uncomplicated peptic ulcer. Under no circumstances should resection be undertaken unless the patient is a good risk; neither should the operation be done by an "occasional" operator or by a novice. In the absence of an expert gastric surgeon, simple closure is the better procedure.

There is no fixed rule in the selection of patients for resection. The expert gastric surgeon will know by experience which patients are and which are not suitable. The good risk is generally young, with recent perforation and with a greater or lesser degree of peritoneal soiling. There is little or very little physiobiochemical disturbance, and the general condition is good. Once in a while an older patient may tolerate resection. Two women among my patients were nearing 60 years of age. They went through the operation safely. Both had minimal peritoneal soiling; their general condition was good, and both were considered good risks.

It should also be emphasized that before operation, time (even though short) should be taken to control pain, combat shock and correct dehydration or any noticeable or probable biochemical disturbance. One or two pints of blood should be available during or soon after the operation. Before the abdominal wound is closed, the peritoneal cavity should be gently but thoroughly dried of its contents, and 200,000 units of penicillin and 2 gm. of streptomycin, dissolved in about 20 cc. of physiologic solution of sodium chloride, should be instilled into the peritoneal cavity. I consider thorough drying of the peritoneal cavity very important —indeed, essential to successful operation. Although penicillin and streptomycin, instilled into the peritoneal cavity, are important, they are not absolutely necessary adjuncts. postoperatively, the importance of keeping the stomach continuously empty by intermittent or continuous suction, of restoring and maintaining fluid, electrolyte, and vitamin balance, and of giving the sulfa drugs, penicillin and streptomycin in full therapeutic doses should not be forgotten. These measures are obvious to the expert surgical therapist, but I emphasize their importance nevertheless, because I consider them essential to the successful outcome in any case.

In this country, where the facilities for early diagnosis of acute perforation are available, where excellent operating conditions abound in abundance and in excellence, where preoperative and postoperative care are highly developed, where many excellent gastric surgeons are found and where the mortality rate of elective gastrectomy for peptic ulcer has reached the low level of 2 per cent and even less, the practice of primary resection of the stomach for perforated ulcer should find ready acceptance. There is a famous saying, "The proof of the pudding is the eating." Why not give the procedure a fair trial? I am sure the mortality rate will not be increased. Possibly it will even be lower than it is at present.

SUMMARY AND CONCLUSIONS

Gastroduodenal resection for acute perforated peptic ulcer has been shown to be possible and safe even in the presence of diffuse peritoneal contamination. By comparative figures it has also been amply demonstrated that this procedure results in a lowered mortality rate and superior postoperative results, both immediate and permanent. In the hands of the expert gastric surgeon, it should not increase the hazards of operation. Of course, it becomes a double-edged sword if it is employed indiscriminately by the "occasional operator;" but, in my opinion, to condemn a procedure that one has not given a fair trial bespeaks dogmatism and lack of scientific open-mindedness.

Selection of Surgical Procedure in Treatment of Cancer of the Rectum

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MUCH evidence has accumulated to show that metastatic spread of cancer of the rectum varies with localization. The data obtained from studies of lymphatic spread and of pathologic specimens is now being confirmed by the statistics of such investigators as Babcock,[1] Wangensteen,[2] Dixon,[3] Mandl,[4] D'Allaines,[5] Bergeret and Livory,[6] Nickel[7] and others. In 1946, C. W. Mayo[8] stated: "There should be many and there are many surgical procedures for the surgical treatment of cancer of the rectum. It is imperative for the surgeon to be familiar with all in order that a selection may be individualized for the patient." Such selection can be made only with proper knowledge of the mode of metastatic spread. For this reason a survey of the literature should prove of interest.

INTRAMURAL SPREAD

Handley[9] in 1910 observed cells stained by mucicarmin several inches beyond the site of the tumor, but Cole[10] and Monsarrat and Williams[10] contested these findings. Mucicarmin is a mucus-selective dye not selective to cancer cells. In 1911 Fagge[11] presented 2 cases in which there was some evidence of intramural propagation.

Cole[10] cited 1 case of his own, with invasion 14 inches (35.5 cm.) above the tumor.

Miles[12] found no macroscopic evidences of invasion of the mucosa in the specimens at the Royal Museum of Cancer in London.

Dukes[13] offered the same explanation as did [illegible] that mural spread is possible only [illegible], this being a late process. On [illegible] Cunéo,[15] Bastianelli,[16] and Simpson and Mayo[17] found no such evidence of intramural spread.

Recently, in their study of 103 specimens, Black and Waugh[18] observed that the extent of spread was never more than 2 cm. from the lesion in the intestinal wall.

VENOUS SPREAD

The frequency of blood vessel invasion is a matter of controversy. Seefeld and Bargen[19] observed it in 10 per cent of cases; Bacon and Rowe[20], in 12.9 per cent; Coller, Kay and McIntyre[21], in 15 per cent; Dukes and Bussey[22], in 17 per cent, and Grinnell[23], in 36 per cent.

Seefeld and Bargen[19] stated that in 94 per cent of their cases in which the blood vessels were invaded there was visceral involvement also and that 80 per cent of the patients died of recurrence or metastasis. Lahey[24], in a series of 1,800 cases, found only 14 per cent of five-year cures among patients with blood vessel invasion. Grinnell[23] observed that 90 per cent of the patients with visceral metastases showed invasion of the vessels.

Westhues[25], as well as Grinnell[23] and Brown and Warren[26], noted a high incidence of blood vessel invasion. Westhues, however, expressed the opinion that in most instances there is obstruction of the vessels by thrombosis or cancer cell destruction. This statement appears to be confirmed by the investigations of Schmidt[27] and Wood[28].

Brown and Warren[26] also stated that most of the cancer cells that reach the circulation fail to survive.

According to Grinnell[23], the caliber of the vessels involved is more important than their number, invasion of the blood vessels being in the immediate neighborhood of the tumor.

Gilchrist and David[29] observed metastases close to the lymph nodes.

Even in this event, surgical intervention is of value only when vascular invasion is local-

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[illegible] of the International [illegible] Wyoming [illegible] Department [illegible] Phil ized It seems clear, therefore that lymphatic spread is much more extensive than is invasion of the blood vessels, and for this reason the extent of the operation will be determined by the gland bearing area rather than by vascular or intramural extension

LYMPHATIC SPREAD

Data available at present are sufficient to permit an outline of the areas of lymphatic spread in the rectum These areas may be subdivided as follows

Intramural Areas The inferior area is the anal canal, limited above by the pectinate or anorectal line (Quenu[30], Gerota[31], Villemin, Huard and Montagne[32], Semba[33], Nesselrod[34] and Herzmann[86]) The intermediate area is the area between the pectinate line and 3 cm above this line (Poirier, Cunéo and Delamere[36]) Gerota[31], Villemin, Huard and Montagne[32] and also Oliveira[3] designated the middle Houston valve as the upper limit (Kohlrauch's valve)

The superior area does not possess the same sharp delimitation with the sigmoid as does the intermediate, but it is a definite area

Extramural Areas The inferior collecting trunks go to the inguinal glands, especially to the superior and inferior internal groups The middle collecting trunks drain part of the anus and the lower portion of the rectum They pass through the lateral ligaments of the rectum, following closely the middle hemorrhoidal vessels

Commonly the first important node is the one described by Quenu[30], which appears in one of Mascagni's[38] drawings (1833)

Poirier Cuneo and Delamere[36], found the Quenu gland and in some cases a relation between it and the sacrolateral gland or one over the external iliac artery

Villemin Huard and Montagne[32], Semba[33], Looney[39] and Oliveira[3] found that, in addition to the hypogastric gland, the lateral and middle sacral glands were involved when the dye was injected in the middle area Cuneo and Marcille[40] described some glands below the hypogastric gland

Reinhold[41] observed a connection with Denonvillier's fascia reflection of the rectal fascia stressing the importance of its removal We have frequently observed this when injecting a dye before the operation to visualize the lymphatics

Contrary to what was stated by Miles[4] spread through the levators is not common Lateral spread extends along the middle hemorrhoidal vessels i e, well above the levators In innumerable sections Wood and Wilkie[43] were unable to note any evidence of metastasis In 100 cases Dukes[11] found only 1 case of metastasis along the levators

In the superior area the lymphatic glands as described by Gerota[31] are placed along the superior hemorrhoidal vessels throughout the rectum from the upper part of the levator to the inferior mesenteric vessels, regardless of whether their point of origin is the anus, the middle area or the superior area

LYMPHATIC METASTATIC SPREAD
VARIATIONS AND RELATION TO NORMAL SPREAD

Metastases by way of the lymphatics as a rule follow the same pattern as has been observed in experimental work

Gabriel, Dukes and Bussey[44] called attention to the orderly and predictable course of lymphatic spread "The first glands to receive metastases are those situated in the perirectal tissues at the same level or immediately above the primary growth The next to be affected are the chains of glands accompanying the superior hemorrhoidal vessels As a rule these are invaded in sequence from below upwards "

The accuracy of this description may be demonstrated in drawings presented by those who have studied the subject (McVay[42], Wood and Wilkie[43], Westhues[25] Coller, Kay and McIntyre[21], Grinnell[23], Gilchrist and David[29])

Gilchrist and David[29] were able to demonstrate this experimentally, pointing out that there is an orderly spread The involved node prevents further spread until it is completely overwhelmed by carcinoma Further embolic spread is through the collateral lymph channels, each new node involved tending to make a longer channel for a new embolus to travel

Gabriel, Dukes and Bussey[44] observed only 1 case in which the spread was not orderly Wood and Wilkie[43] observed 6 similar cases, Grinnell[23] 7, and Coller, Kay and McIntyre[21] 3

This is easily explained by the variations of the main stems According to Villemin, Huard and Montagné[32], there are short, medium and long stems. The short collecting trunks follow closely the superior hemorrhoidal vessels. After traversing the Gerota glands they reach a group of nodes at the bifurcation of the superior hemorrhoidal arteries. The medium trunks, after piercing the rectal wall, pass without interruption to the group of glands located in the mesosigmoid, immediately below the origin of the last sigmoidal artery. The long trunks, also, are not interrupted by the anorectal glands. They end in the group immediately below the left colic artery.

The short collecting trunks are the more common. The other two types are met with in a few cases only. These findings were confirmed by Oliveira[47]. It is possible that more than one of the trunks may be involved. The importance of this observation is obvious. There may be a small lesion with few nodes involved close to the region but with one node in the inferior mesenteric artery just below the left colic artery.

RETROGRADE SPREAD

It is assumed that retrograde spread is of little importance. Retrograde spread 1 cm. below the lesion was observed in 1 of 100 cases by McVay,[15] in 1 of 74 cases by Westhues,[illegible] in 1 of 53 cases by Coller, Kay and McIntyre,[21] in 1 of 75 cases by Grinnell[23] and in 2 of 146 cases at 2 and 6 cm. respectively by Bacon and Rowe.[24]

Gilchrist and Davis[2] observed involvement of the nodes below the lesion in 7 cases: in 2 cases 3.5 to 5 cm.; in 2 cases 2.5 to 3.5 cm., and in 3 cases between 1 and 2.5 cm.

Colp[1] noted involvement in 1 case at 3 cm. and in another at 5 cm. Glover and Waugh[17] observed involvement in 2 cases between 3 and 7 cm. and in 7 cases between 1 and 3 cm.

It is difficult to appreciate correctly the [illegible] these data, because in some of the [illegible] the phenomena were observed [illegible] intermediate area, i.e., the area [illegible]. It is difficult to determine [illegible] gland belongs to the [illegible] can be drawn. [illegible] the inter- [illegible] can be [illegible] in the resection. Invasion of the sphincters may be considered exceptional.

In the case of cancer located in the anal canal or in the lower 3 cm. of the rectum, metastases can be found in all three areas, according to the lymphatic flow and the pathologic observations.

When the cancer is located above the limits of the intermediate area there is no reason to anticipate spread to other areas, unless the retrograde spread intercommunicates thereby or therewith.

In this particular field there is the greatest lack of evidence. All studies have been made on surgical specimens. It is almost impossible to determine exactly what occurs beyond the resected area.

The paper presented by Coller, Kay and McIntyre[21] is one of the few in which there is correlation between the location of the tumor and the mode of spread. These authors were unable to demonstrate lateral or downward spread when the cancer was located 3 cm. above the pectinate line. In the cases of lateral spread they found involved nodes up to the limit of the resection. In these cases little is known concerning extension beyond this level. This is very important, because, as was indicated in the discussion of lymphatic spread, the hypogastric, lateral and middle sacral glands are the main glands of the lateral pedicles. Not infrequently enlarged nodes are found laterally in the lateral pelvic wall after resection of the rectum.

SUMMARY AND CONCLUSIONS

On the basis of the foregoing remarks, it is our opinion that there should be more than one procedure for treatment of cancer of the rectum.

1. When the lesion is located 3 cm. or more above the pectinate line, the sphincter musculature can be preserved provided the entire rectum and the levators are resected. The reason for resection of the entire rectum is the risk of retrograde spread. D'Allaines,[5] in resecting 3 cm. below the lesion, had 2 recurrences in the distal bowel in a series of 100 cases. Denis[1] had 3 similar cases. Removal of the levators is essential, since some of the anorectal glands involved may be found above

the levators and in such close proximity to them that they can be removed only by the resection of the muscle In addition removal of the levators is the only means to extirpate thoroughly the lateral ligaments which represent the main pathway of lateral spread

The operation that can fulfill these aims is the one described by Babcock and modified by one of us It is as radical as the Miles operation when the cancer is above the intermediate area of spread

A similar operation was described by Ricard[49] and Roux[50] for treatment of cancer of the rectum Other modifications have been reported by Swenson[51] and Blake[52]

Operations with preservation of a segment of the rectum reported in the past are shown to be insufficiently radical Lately they were revived by Wangensteen,[53] Dixon,[3] D'Allaines[9] and others, with good results From the last reports of Wangensteen[53] and Dixon[3] it is apparent that they had to limit the indications using them only when the lesion is very high in the rectum, i e, in a strictly limited area where there is no possibility of lateral spread, when at least 5 cm of the rectum is resected below the lesion

2 There is no doubt that the Miles procedure is the operation of choice for low lying tumors when there are possibilities of downward spread, because by this procedure not only the nodes located high along the superior hemorrhoidal vessels but also those in the perianal fat are resected

3 As the lateral gland bearing area is not resected widely enough with the Miles operation, a complementary lateral dissection may prove useful the dissection being made laterally from the external iliac vessels to excise the iliac and hypogastric glands The lateral and middle sacral glands can be dissected out during liberation of the posterior aspect of the rectum

SOMMAIRE

C'est notre opinion qu'il devrait y avoir plus d'une procedés pour le traitement du cancer du rectum

1)—Quand la lésion est située à 3 Cm ou plus au dessus de la ligne pectinee, la musculature du sphincter peut être conserveé si le rectum en entier et les elévateurs sont réséqués On reseque le rectum en entier pour prévenir la possibilité de l'extension rétrograde D'Allaines dans une série de 100 cas avec une résection de 3Cm en dessous de la lésion, eut deux récidives dans l'intestin distal Denis eut 3 cas semblables L'ablation des élévateurs est essentielle en raison de la présence des glandes anorectales au dessus de evateur le peuvent être siege de metastase, ces glandes sont si proches des levateurs qu'elles ne peuvent être enleveés qu'en résequant ces muscles En plus, l'ablation des élévateurs est le seul moyen d'extirper completement les ligaments latéraux qui représentent la voie principale d'extension latérale

L'operation qui peut remplir ces buts est celle décrite par Babcock et modifiée par un de nous Elle est aussi radicale que l'opération de Mills quand le cancer est au dessus de la région intermédiaire

Une operation semblable fut décrite par Ricard et Roux dans le traitement du cancer du rectum D'autres modifications ont été rapportées par Swensen et Blake

Les opérations avec conservation du segment du rectum, rapporteés dans le passé, sont insuffisamment radicales Récemment, elles ont été reprises par Wangensteen, Dixon, D'Allaines et d'autres, avec de bons résultats D'apres les derniers rapports de Wangensteen et Dixon, il est apparent qu'ils furent obligés d'en limite les indications et de n'employer ce procéde que lorsque la lésion est située tres haute dans le rectum, c'est a dire dans une région strictement limitée ou il n'y a pas de possibilite d'extension latérale, ou il y a au moins 5Cm du rectum réséqué au dessous de la lesion

2)—Il est incontestable que le procédé de Melís est l'opération de choix quand il y a possibilité d'extension par en bas parce que procédé permet d'enlever non seulement les ganglions situés le long des vaisseaux hémorroidaux supérieurs, mais aussi ceux situés dans le tissu adipeux périanal

3)—Quand la région latérale renfermant les ganglions n'est pas réséqueé suffisamment par l'opération de Mills, une dissection latérale complémentaire peut être utile Cette dissection est faite sur le coté des vaisseaux illiaques externes pour permettre l'excision des ganglions illiaques et hypogastriques Les

ganglions de la région sacrée et médiane peuvent être enlevés durant la libération de la portion postérieur du rectum.

RIASSUNTO

Ritiene che il cancro del retto richieda più di una sola tecnica operativa.

1-Quando il tumore risiede almeno 3 cm. al disopra della linea pettinata, lo sfintere può essere risparmiato, purchè il retto ed i muscoli elevatori siano totalmente escisi. Il retto va completamente rimosso per il pericolo di una diffusione retrograda del tumore. Sopra un totale di 100 casi, nei quali ha reciso il retto 3 cm. al disotto del tumore, d'allaines ha lamentato infatti due recidive nella parte distale dell'intestino, mentre Denis ha riscontrato 3 casi del genere.

L'escisione dei muscoli elevatori trova invece la sua ragione nel fatto che alcune delle ghiandole ano-rettali possibilmente invase dal tumore sono in così intimo contatto con i fasci muscolari, da richiedere la loro rimozione. Oltre a ciò, l'asportazione degli elevatori e' necessaria per un'escisione completa, accurata, dei legamenti laterali i quali rappresentano la principale via di diffusione del tumore ai lati del retto.

L'operazione di Babcock, modificata da Bacon, risponde perfettamente a questi requisiti anatomo-patologici; e' un'operazione non meno radicale di quella di Niles, che si presta invece preferibilmente per i carcinomi situati al disopra dell'area intermedia. Un'operazione consimile e' stata descritta da Ri[illegible] e Roux: altre modificazioni sono state [illegible] da Swenson e Blake.

La conservazione di una parte del retto, [illegible] nel passato non abbastanza radicale, [illegible] riesumata da Wangensteen, Dixon, D'A[illegible] da altri, ma subordinatamente a [illegible]. Il tumore deve essere situato [illegible] molto alta del retto: in un' [illegible] limitata, nella quale non vi [illegible] di diffusioni laterali: quando [illegible] 5 cm. al disotto del [illegible] di Niles rap- [illegible] la [illegible] lungo i vasi emorroidari superiori, ma anche quelle distribuite nel grasso perineale.

3-L'operazione di Niles va pero' estesa, onde rimuovere piu' completamente la zona situata lateralmente al retto, che e' la piu' ricca di ghiandole. Una dissezione complementare, estesa lateralmente dai vasi iliaci esterni, consente l'asportazione delle ghiandole iliache ed ipogastriche. Le ghiandole sacrali vengono escise durante la liberazione della faccia posteriore del retto.

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For summary in
Spanish see Page 121

Connective Tissue and Its Derivatives
Surgical Significance in the Light of Embryogeny

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EACH of the three germ layers, the ectoderm, the mesoderm and the entoderm, plays a specific, important part in embryogeny. Each germ layer develops in a given direction, and specific organs and systems of organs are formed from each. For the purposes of the present paper a brief review of this process of development may be pertinent. I shall deal mainly with the mesoderm-mesenchyme-mesoblast, all of which are designations applied in specific connections to the mesodermal germ layer and its derivatives. The significance and development of the ectoderm and the entoderm may be limited here to a few brief references.

1. The ectoderm gives rise to the skin and to certain organs and systems of organs important from the surgical point of view, such as the mammary glands, the central nervous system, and the peripheral, sympathetic and parasympathetic nervous systems.

It may be said that the ectoderm is the matrix of the noblest organ of the human body, the brain. The sympathetic and parasympathetic nervous systems have become important objects of study in science and practical surgery within the last two decades. As a result of the investigations of Leriche and his school, surgery of the sympathetic system has become highly topical. This is true especially in alleviation of blood circulatory disorders arising from certain arterial diseases—particularly [illegible] obliterans (Buerger's disease) [illegible] the remedying of painful conditions [illegible] from such disorders.

2. [illegible] gives rise to the mucous [illegible] the entire alimentary canal [illegible] of those of the buccal [illegible] and to the epithelial [illegible] intra-abdominal [illegible] and the pancreas. [illegible] and the organs developing from these—the salivary, thyroid and parathyroid glands, the thymus, and the tonsils—are of entoblastic pharyngeal origin. At an early stage of fetal development these organs separate from their origin. Organic connection with the matrix tissue, the primordial pharynx, is retained in exceptional cases only, as is well known from practical surgery.

The alimentary canal, a highly complicated symbiosis of the entoblast and the mesoblast, need not be dealt with at greater length in the present connection.

3. The mesoblast gives rise to bone, cartilage and muscle (both smooth and striped); to the articulations and all their components; to the ligaments, tendons and aponeuroses; to the heart, the blood vessels and their corpuscular elements; to the endothelial linings of the large body cavities, the mesentery, adipose tissue, omentum, pia mater, dura mater and interstitial tissue of the brain—the glia or fibroglia, as it also is fittingly called. The mesoderm is a very important—for many reasons the most important—germ layer. In this connection mention is made only of the fact that the development of the macro- and microanatomic structure and internal architecture of the various organs is dependent upon and supported by the mesoderm. It forms the support for all tissues in a mechanics functional sense, and its "good will"—in the form of normal blood circulation—deserves the gratitude of the entire organism, whose existence it really maintains.

It may be mentioned here that the capillaries and precapillaries are situated throughout the supporting tissue and that metabolism —the transfer of nutrition to the surrounding tissue fluid and the absorption of waste into the venous blood—takes place through their walls. There are no blood vessels in the epithelial tissue.

It has been mentioned in connection with the ectoderm that this germ layer gives rise to the brain The mesoblast, however, may with good reason, and in my opinion with full justice, claim for itself the most important and the foremost position as the germ layer that gives rise to the organs of greatest consequence for the vast human race *The genital organs are of mesodermal origin* The first rank importance of the brain is of course not to be underestimated, but the brain is biology's gift to the individual Without the genital glands there would exist no higher living organisms

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* [illegible]

Two vast, boundless extremes can be here placed in contraposition They open an infinitely broad vista, even if we limit ourselves to the consideration of that living being which has reached the highest development, man, and omit the lower animals from the apes downward

On the one hand we have the male and female gametes, the union of which in fertilization is the starting point for the development of a new individual We can proceed still farther in seeking the "infinitely minute," for actually we have here the question of certain extremely small particles of the *nuclei* of the gametes, the chromosomes, which determine not only the somatic structure and development but the psychic nature of the future individual All the somatic and psychic characteristics of the individual lie potential in the chromosomes

The antithesis of this infinitely minute factor is the vast human species, with its hundreds of millions of individuals This contrast is indeed stupendous The picture becomes still more overwhelming when we remember that the example selected here, homo sapiens, is only a small fragment in the immense process that takes place every moment in the field of biology And, according to biochemistry, the nucleic acid in the chromosomes probably is responsible for everything connected with the origin and development of an individual[1]

The development of the fetus is incredibly rapid All the germ layers and their derivatives differentiate at a very rapid rate, and within nine months a fertilized human egg cell has developed into a viable young human being Since congenital malformations are extremely rare, the development of each germ layer in its own specific direction is admirably regular Cell growth is so rapid that it has been compared, reasonably enough, to the unrestrained growth of a malignant tumor Embryogeny, however, is a physiologic process The development of the newborn child is less rapid

When connective and supporting tissues are referred to, there spontaneously come to the mind of a surgeon the bones tendons, ligaments, aponeuroses, muscles and adipose tissue, which are employed in surgery for almost countless purposes in plastic operations, orthopedic procedures and free tissue transplantations

This one sided contact of practical surgery with the derivatives of the mesoderm is probably due to the fact that we do not happen to think of, or have for the moment forgotten, the embryogenic fact that the mesoblastic tissue develops—perhaps through the action of humoral chemism—in two directions, one of which is quantitatively the smaller but is no less important for that On the contrary this germ layer forms the entire urogenital system, with all the related epithelial organs the kidneys bladder, prostate gland, ovaries testes, epididymis, etc

The parenchyma of the adrenal glands is derived from two germ layers One of these is the mesoderm, while the ectoblast, or more specifically the neurectoblast, gives rise to the medullae of the glands The biologic, physiologic and pathophysical action of the medullary hormone is directed upon the sympathetic nervous system The hormone of the mesoblastogenic adrenal cortex is believed to be the cause of Addison's disease, and it is also regarded as playing a part in the etiology of hypertonia

When we further mention that the reticuloendothelial and the cardiovascular systems are of mesodermal origin, it is obvious without further proof that the mesoderm fulfills a very important and diversified function It may be mentioned also that, with respect to the tissue structure, the capillaries and precapillaries are everywhere connected with the finest and thinnest mesodermal tissues

The ectoderm and the entoderm, with their derivatives, represent a kind of *static* condition, whereas the mesoderm offers a fitting ex ample of tissue *dynamics*. It is this quality that accounts for the great biologic significance of the mesodermal germ layer.

There is a striking contrast in the existence and volume of blood circulation in some derivatives of the mesoblast itself. There are no blood vessels in the ligaments, tendons and aponeuroses, yet the muscles, the adipose tissue and particularly the parenchymatous organs of mesenchymal origin obtain their nourishment by means of the blood circulation. How and from what source is nourishment conveyed to those mesenchymal derivatives which are not provided with blood vessels?

These fascial tissues are sustained by the surrounding interstitial tissue fluid. They are formed of connective tissue fiber in an elastic network, which—even if we do not take bone into account—ensures their firmness and strength. Although they seem to be deficiently nourished, these tissues are successfully used by surgeons in plastic operations of various kinds and even for auto-transplantation, whereas the "tissues of higher order" are suitable for these purposes in exceptional cases only. If the latter are used for pedicle grafts, care must be taken that the strip of fat, muscle or other tissue can receive its nourishment through the pedicle; otherwise, aseptic necrosis will develop in the transplant, or the same transplant will soon be converted into connective tissue that fully resembles malformed cicatricial tissue (cicatrix vitiosa). Fat tissue can be employed under certain conditions, even for free transplants, without conversion into connective tissue. The condition for success is that the transplant is not subjected to pressure or tension in its new environment. It has been experimentally demonstrated for example, that fat tissue can be used successfully as a substitute for cicatrized dural tissue. The surgical treatment of posttraumatic epilepsy consists actually of count- [illegible] cicatrix formation. Excision of [illegible] the dura mater will invariably [illegible] scar, which at first consists of [illegible] but progressively contracts [illegible] thus once more provid- [illegible] for continua- [illegible] Lexer has [illegible] experimentation that the formation of a new contracting cicatrix is averted if the tissue defect produced by excision of the scar is filled by an autotransplant of adipose tissue. The latter then almost completely fulfills its original tissue structure in the new environment. I can refer to two cases in my own experience, in which fat tissue was very successfully used as filler for dural tissue in the brain.

The reliability of these findings is also proved by the changes observed in mobilization of the knee joint after the use of fat grafts to cover new articular surfaces. In those parts of the articular surfaces of the nearthrosis which have been in mutual contact and subject to pressure, particularly static pressure and friction, the transplant undergoes conversion into cartilaginous connective tissue. In the periphery of the articular surfaces, on the other hand, where no direct friction or pressure has been present, the transplant retains its original structure fairly well.

Surgical pathology offers numerous examples of the conversion of bone, periosteum, muscle and fascia into cartilaginous connective tissue. This is most frequently seen in the articular surfaces of a pseudarthrosis. It is generally conceded that a possible cause of pseudarthrosis, (in addition to certain constitutional diseased conditions) is interposition of the surrounding tissues between the fragments at the time of fracture. Under such circumstances the fracture will not heal even by strong periosteal reaction, and the intervening tissues are gradually changed into cartilaginous connective tissue. The articular surfaces of the pseudarthrosis and the nearthrosis are not true cartilage. Reference is made in this connection to the studies by Pary and myself.

In congenital dislocations of the hip—at least in those of many years' standing—a new articular socket with a surface of cartilaginous connective tissue is formed at the site of the dislocation. In a case of arthrosis coxae, I have recently seen a roentgenogram that exemplified a typical nearthrosis between the lesser trochanter and the outer surface of the ischium, in a location where those bone surfaces had been subject to prolonged contact and friction due to severe contraction of the adductor muscle. Periosteal bone regeneration is frequently seen in cases of arthrosis deformans coxae Owing to contraction of the adductor, the head of the femur tends to slip outward into a subluxar position The eaves like process mentioned above prevents subluxation but at the same time it almost completely prevents abduction of the thigh Lexer probably used this projection as a model in grafting an eaves like transplant of bone to prevent the subluxation from becoming a pathologic luxation

In cases of operative nearthrosis, histologic examination of the inner surface of the capsule formed from the new tissue offers some interesting observations This inner surface consists of a new synovial membrane, which histologically does not differ in any respect from the normal synovial membrane The metamorphosis is naturally the result of mechanical and functional irritation

From what source do the tendons derive their nourishment, since they have no blood vessels? The long tendons of the digits, both fingers and toes, have their own tendon sheaths, and the sheath cavities contain a small amount of viscid, transparent fluid There can be no doubt that the tendons are nourished by the synovial fluid This probably explains the fact that, when in tendon lesions the tendon sheath must be surgically opened, the result leaves much to be desired In cases of acute tendovaginitis the outcome of incision of the sheaths is fatal to the tendons owing to the development of necrosis and sequestra in the exposed parts Intravaginal penicillin therapy probably opens new prospects for the cure of tendovaginitis ad integrum, for this condition is usually produced by streptococci which are highly susceptible to penicillin The condition for success is, of course, that the tendon sheath is not incised but merely denuded, without injury to the tissues, to a degree that permits removal of the pus from the sheath cavity by suction and injection of the penicillin solution Injury is thus avoided to the endothelium of the tendon sheath, by means of which the tendon apparently is nourished

The regenerative power of cartilage is generally held to be poor This quality is active only in epiphyseal discs in early life Simultaneously with an increase in the epiphyseal tissue, salts of calcium and phosphorus are deposited in the interstitial tissue, which prior to this has lost its homogenic structure and become changed into collagenous fibers Enchondromas and ecchondromas are also examples of the proliferation of cartilaginous tissue, although the ossification of these chondromas is almost complete at a comparatively early stage

What are the observations made in connection with joint mice, whether these are of post traumatic origin or a result of osteochondritis dissecans? These loose pieces maintain their viability in the articular cavity, in other words, they take their nourishment from the synovial fluid The bare bone surface of the joint mouse is soon covered with a layer of cartilage Its bony core is clearly seen in the roentgenogram, although it appears smaller than its original size It is not definitely known whether this regeneration of the cartilage takes place by apposition from the edges of the cartilaginous layer or by cartilaginous metamorphosis of the bone, but it must be admitted that the capacity of cartilage for proliferation is, on the whole, poor Cartilage cannot be employed in autotransplantation A wound or a traumatic defect in the cartilaginous tissue usually heals by means of a connective tissue cicatrix

Two collateral phenomena occur in bone transplantations resorptive decalcification through osteoclasis and formation of osteoblastic tissue (substance préosseuse, Leriche Policard) This preosteal tissue calcifies, and the complete substitution process which is the object of the transplantation takes place The transplant thus becomes entirely new tissue

I revert once more to the subject of cartilaginous tissue in order to deal with its complete destruction in certain forms of arthrosis and spondylarthrosis deformans The basic causes of these diseases are probably hormonal disorders, which lead to the inability of the cartilaginous tissue to withstand static and functional strain It starts to "wear out" gradually, resulting in progressive aseptic destruction of the spongy bone below the cartilaginous layer Eburnation, the condensing of this subchondral bone layer, is unable to retain the normal architectonic structure of the bone The form of the spongy bone at the articular end is changed, and the condyles are compressed and increase in diameter At the same time the cartilaginous layer is completely worn off. These changes are familiar to all surgeons interested in surgery of the bones and joints.

Foci of softening, in the form of fatty degeneration, are often seen in the spongy bone at the articular end. It is my experience that mobilization of the joint will not be under these conditions. I have been unable to note any signs of bone regeneration in the form of new spongy bone in such degenerative foci. The action of the deforming process continues, and bone of such subnormal quality cannot stand the static strain. The changes mentioned have been observed by me mainly in connection with arthroses of the knee joint. In arthroses of the hip joint, on the other hand, the active eburnation of the head of the femur and the articular socket is a relatively common process. In conjunction with certain other processes this probably accounts for the considerably better permanent results obtained in arthroplasty of the hip joint as compared with that of the knee joint. A fact also to be noted is that, in cases of arthrosis deformans, proliferation of bone cartilage is invariably seen in the marginal parts of the joint, that is, in parts not subject to direct static or functional strain. These fringes, "Randwülste," which invariably accompany arthrosis deformans, are clearly visible in the roentgenogram.

Arthrosis deformans may develop in the preclimactic period, but so far it is not definitely known whether it occurs at that time as a result of dysfunction of the genital glandular hormones. The cause of the systemic diseases connected with certain forms of arthrosis deformans occurring in childhood has not yet been determined.

It is interesting to note that at least in the more common forms of arthrosis deformans, [illegible] or misdirected function of the epithelial organs of the mesoblast—the genital [illegible] will lead to incurable tissue diseases [illegible] are of mesenchymal origin. [illegible] of the dynamic qualities of the mesoderm are provided by the numerous ovariogenic and testogenic hormones isolated in recent years. These have great therapeutic significance.

SUMMARY

The surgical significance of connective tissue and its derivatives is examined from the embryogenic point of view. The embryologic course of development of ectoderm, mesoderm and endoderm is traced as a basis for discussion, after which the permanent influences and effects of these embryonic elements upon the human organism in health and disease are explained. Particular attention is paid to the surgical implications, especially as regards plastic operations, autotransplants and the surgical treatment of articular disease.

SOMMAIRE

L'importance chirurgicale du tissu conjonctif et de ses dérivés est étudiée du point de vue embryogénique. L'auteur decrit le développement pour base de discussion, de l'ectoderme, du mésoderme, et de l'endoderme et explique leurs influences permanentes sur l'organisme humain en comme santé et malade. Il etudie particuliciement, l'importance chirurgicale de ces données surtout en ce qui concerne les opérations plastiques, l'auto-transplantation et le traitement chirurgical des maladies articulaires.

RIASSUNTO

Esamina dal punto di vista embriologico il significato che assume—di fronte ai problemi chirurgici—il tessuto connettivale ed i suoi derivati. Ricollega quest'esame alle diverse fasi di sviluppo dell'ectoderme, del mesoderma e dell'endoderma, cercando di spiegare l'influenza spiegata da questi elementi embrionali sopra l'organismo umano in condizioni normali e patologiche. Particolarmente importanti sono gli effetti sopra i risultati di talune operazioni: quelle piu' direttamente interessate sono le operazioni plastiche, le operazioni sopra le malattie articolari, gli autotrapianti.

For summary in
Spanish see Page 122

The Value of Cystoscopic Photography

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ENDOSCOPIC photography has been established as an important adjunct to the profession It is the purpose of this paper to present modern endoscopic equipment capable of accurate photographic reproduction in natural color and to show the value of these photographs after they are taken Although originally used in cystoscopic procedures, this equipment is so versatile that it may be applied not only to the cystoscope but to many types of prismatic endoscopic equipment used routinely in surgical practice today It is believed that the photographs produced are of inestimable value as visual records, not only to the physician himself but to the patient as well

Visualization of the different canals and cavities of the human body has been attempted or done since the dawn of medical practice The instruments of early times were crude and permitted only inadequate visualization It was not until Max Nitze introduced the prismatic cystoscope that visualization of the urinary bladder was possible As early as 1894 Nitze attempted to photograph the interior of the bladder The photographs he produced were not clear, and the image was distorted The instrument was cumbersome in design, and, as the photographic detail was not perfect, the equipment was quickly abandoned Since that time numerous instruments for cystoscopic photography have been conceived and advanced by as many investigators Some of them have been fairly successful, but the exposed films were lacking in perspective, photographic detail and photographic quality The results of many other attempts at endoscopic photography have never been published, because of lack of detail or distortion of the image It is surprising to learn of the number of investigators who have envisioned the value of the endoscopic photograph and who, for one reason or another, became disgusted with their investigation, admitted failure, and unfortunately discarded their unfinished work

I reported the results of an original experimental study in 1940 On an untried photographic principle the cystoscopic lens was used like the lens of an ordinary camera, and photographs of excellent quality and detail were produced This work was done with standard cystoscopic equipment and with orthochromatic film, producing a black and white photograph The photographic detail was good, but one great factor was lacking, namely color Further experimental study was undertaken to produce intravesical photographs in natural color The greatest problem then was to procure a low voltage lamp that would produce sufficient light to make photographs in natural color This was accomplished, and photographs in natural color were made This work was reported in December 1943

Experimental work continued until the equipment was perfected The camera, although originally designed for cystoscopic photography, has now been so constructed that it may be applied to any field of endoscopic photography in which prismatic equipment is or may be used With standard Kodachrome A, 35 mm film photographic images 16 mm in diameter are readily produced It is a much simpler procedure to produce photographic images in black and white, owing to the relative speed of the film used, but the value of black and white photographs as compared with color photographs is not great

There are several highly important factors and unless cognizance is taken of these, natural color endoscopic photography will result in failure The most important of these factors is light The light must be true white and brilliant to such an intensity as will expose the color film properly Color film is known to be a great deal slower than black and white film The second factor is use of the proper distending medium However, in those cavities of the body in which air may be used, this second factor need not be considered Intravesical

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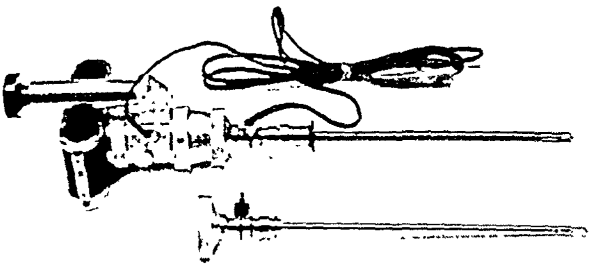
photographs, of course, must be taken through a fluid medium; and, although all fluids deflect light rays, it has been found that sterile distilled water causes less deflection than does any other fluid. The distending medium must be sparkling clear. The presence of pus, blood or cellular debris, so frequently observed in vesical pathologic conditions, will cause deflection of the light rays and produce a hazy outline on the negative. Therefore, preliminary irrigation of the bladder is imperative.



The McCrea endoscopic camera. There are two lens systems, a right angle and a foroblique. A bayonet lock is used, and the lenses are readily interchangeable. (Acknowledgement is made to Mr. Frederick Wallace, president, American Cystoscope Makers, and his staff for assistance in design and perfecting of this instrument.)

The actual exposure—the mechanical technic of taking a color photograph with this equipment—is neither intricate nor difficult, regardless of the type of photography that is to be done. Anyone capable of doing routine cystoscopic procedures or other prismatic instrumentation is capable of endoscopic photography. Briefly, the technic is as follows: The endoscope telescope is introduced. The camera is attached by the bayonet lock to the lens system. The light and water connections are made. The taking of the photograph is then an automatic procedure. The light is turned on; the cavity is permitted to fill, and observation of the viscus is made in the view finder. The area to be photographed is selected. The camera, being of fixed focus, requires no adjustment, and the exposure is made merely by [illegible] of the trigger arrangement. The photograph, when successful, has inestimable value. The gradation in color of the vesical mucosa is of vital importance in the interpretation of many lesions. To be able to reproduce not only the physical outline of a lesion but its actual color values and gradations is of value for records, teaching, or textbook illustration, as well as for clinical use.

The ability to depict photographically a given lesion of the bladder or other organ as it regresses or progresses is invaluable for recording purposes, both to the physician and to the patient. This has been demonstrated on several occasions. One lesion in particular, a carcinoma of the bladder, was followed for sixteen weeks during treatment. The photographs were taken every two weeks. The lesion began as a large papillary tumor. The changes were recorded photographically as the entire tumor was destroyed and normal mucosa became visible.

Such photographs, used either in the teaching of students or as textbook illustrations, present facts and factors beyond the scope of words or the most skillful drawing. To visualize and to learn the fundamental nature of either the normal or the pathologic vicus is the basis of good medical practice and also of sound teaching, whether the students are undergraduates or advanced.

The application of endoscopic photography to fields of practice other than urology is also noteworthy. The versatility of the camera just presented is its ready adaptability to prismatic equipment in fields other than cystoscopy. Actual photographs taken through the proctoscope, the laryngoscope, the peritoneoscope or any other prismatic endoscopic instrument will do much to revolutionize medical instruction. The adaptation and use of such equipment will do much to promote understanding of the behavior of many pathological processes.

SUMMARY

The author stresses the high importance of cystoscopic photography in diagnosis, recounts the difficulties hitherto encountered by experimenters, and describes an endoscopic camera he has devised. By means of this instrument he has been able to obtain excellent results with intravesical photographs taken in full natural color by an automatic process.

Treatment of Large and Recurrent Postoperative Inguinal Hernia

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MANY surgeons are under the impression that the operative treatment of hernia is a recent development On the contrary hernia operations have been performed on a large scale during several epochs

For centuries persons afflicted with hernia were objects of scorn and contempt, when a hernia became strangulated and palliative measures failed, it was left undisturbed, and the patient allowed to perish It was not until the beginning of the sixteenth century that strangulation was treated by division of the tissues Surgeons encouraged by successes obtained with the scalpel, began treating reducible and complicated hernia by sanguinary methods that caused a high mortality

Even now the treatment of hernia is a controversial subject It is likely to remain unsettled as long as the statistical recurrence rate varies from zero to 30 per cent Unfortunately, there are patients with deficient muscles and fascia, and there are many other handicaps to tax the surgeon's skill and try his patience Bull, in 1889 stated that recurrent hernias are unmanageable and the despair of the surgeon Hutchins of Johns Hopkins, in 1947, remarked that we still have with us the patient with recurrent hernia who goes from one clinic to another for operation after operation until whatever tissue tone existed originally is dissipated

A casual survey of the literature quickly discloses good, fair and poor results of the same operation by different surgeons Those who secure excellent results with silk and cotton sutures are unfortunate with fascia On the other hand, those experienced and skillful with catgut and fascia encounter a higher recurrence rate when they venture to use silk or cotton Fine steel wire is gaining in popularity but requires special skill and a meticulous technic

Experienced surgeons have few recurrences, but this does not hold good for physicians without special training in the surgical treatment of hernia As DaCosta remarked, "Most surgeons belittle recurrences" However, the longer one observes his patients after difficult hernia operations the lower the percentage of cures One by one, with the passing years, they slip from the "cured" group Most of those who come to me with recurrent hernia state that the surgeon who performed the repair does not know of the relapse, therefore, that surgeon's record carries misleading data as to the number cured

E M Stanton stated that among patients operated on by experienced surgeons indirect recurrent hernias are observable at a rate of 5 per cent the first year and 1 per cent additional recurrence each year thereafter Direct hernias traced over a five year period showed a recurrence rate of 25 per cent

The most frequent causes of recurrence are failure to remove all of the sac, faulty methods of closure, inguinal lipomas, double, saddlebag or pantaloon sacs, postoperative rest, poorly developed musculature, obesity, faulty blood supply, division of the nerves, suture material, poor general health, bilateral hernia operations, asthma, postoperative complications, intra abdominal pressure, and wound infection

Recurrent Indirect Hernia Although most recurrent hernias are direct, many are indirect, especially if the first operation failed to remove all of the sac and the closure of the wound was faulty

Percentage of Recurrence In a series of 2,250 patients with inguinal hernia in my service during the last five years, there were

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286 with recurrences following operations elsewhere. The case records show that in approximately 25 per cent of these the hernia developed immediately after operation; in 28 per cent, within the first six months; in another 15 per cent, in one to six months; in 30 per cent, at intervals varying from six months to five years after operation; in 15 per cent, after five to ten years; in 10 per cent, after ten to twenty years, and in 5 per cent, in twenty to thirty years. Fallis, studying a large series of recurrent hernias, observed that recurrence was common five to fifteen years after operation. He stated that few clinics follow their patients for more than five years after operation.

Percentage of Recurrence of Direct Hernia: The percentage of recurrence for direct hernia operations is 10 to 20 per cent in the hands of the most experienced surgeons. Many report it as falling between 25 and 50 per cent.

Point of Recurrence After Bassini Operation for Indirect Hernia: Indirect inguinal hernia most frequently recurs through the opening left for the cord; occasionally it comes through the deep suture line just above the pubis, and sometimes, though rarely, through the middle of the deep suture line or a weak spot in the muscles or fascia.

Percentage of Recurrence of Indirect Inguinal Hernia: The proportion of indirect inguinal hernias that recur after operation varies from 5 to 10 per cent, depending on the age of the patient and the choice of operation. The recurrence rate is lowest for patients between the ages of 10 and 45 years.

It is impossible to believe that the 200 operations proposed for inguinal hernia are without merit or value in certain cases, but much depends on the judgment and experience of the surgeon.

Mair, in 1945, found in the literature over seventy modifications of the Bassini operation alone. He remarked that many of these, almost identical, were claimed as original by their designers, who apparently were unaware that other surgeons in earlier years had tried [illegible] modifications and found them wanting. [illegible] endeavored to strengthen the [illegible] conjoined tendon and the [illegible] to obliterate or change [illegible] inguinal ring.

Operation for Direct Inguinal Hernia: Many surgeons make the mistake of trying to adapt the indirect hernia operation to direct hernia. This accounts to some extent for the high recurrence rate associated with direct hernia operations.

Cooper Ligament Operation: This operation has shown a lower percentage of recurrences than the inguinal ligament operation (Bassini) and is steadily supplanting the latter in popular favor among surgeons, although the Bassini procedure presents fewer technical difficulties.

Narath is believed to be the first to have sutured the internal oblique and transversalis fascia to Cooper's ligament. Lotheissen, in 1898, published the general details of the operation. He expressed the opinion that this method is best adapted to the femoral hernia region and did not realize its full value for inguinal hernia.

It remained for Babcock, in 1927, to recognize the many advantages of suturing the fascia to Cooper's ligament. Ten years later McVay published a paper on this procedure.

The operation preserves the normal unhampered action of the fascia and muscles of the inguinal region. It is now known that the Bassini operation interferes with normal movement and thus weakens the lower abdominal wall, favoring rather than preventing recurrence. Since the lower fibers of the transversalis and internal oblique fascia are normally attached to the fibrous covering of the pubic bone, Cooper's ligament, and not to the inguinal ligament, it is logical to adopt the suggestion of Babcock and to suture the inferior aponeuroses of the internal oblique and transversalis muscles to Cooper's ligament.

It is generally recognized that the Cooper's ligament operation is more correct from the anatomic and the physiologic standpoint. Ordinarily, when transversalis fascia is sutured to the inguinal ligament, a pocket or gap is left. This becomes a potential recurrent hernia, often before the patient leaves the operating table. There are many modifications of the Cooper's ligament operation. In most of these, Cooper's ligament sutures are used in combination with the usual Bassini procedure.

Fascial Patch: The fascial patch has certain advantages over the fascial suture The patch can sometimes be secured from the external oblique fascia, it is easier to use than fascial stitches, in obese patients there is less constriction of the abdominal contents, there is no increase in intraabdominal pressure with the accompanying danger of pulmonary complications, the operation is shorter and less complicated than the fascia suture method, it requires less handling of tissues, there is minimum danger of injury to blood vessels and nerves

Technic for Applying Fascial Patch Small patches can occasionally be secured from the aponeurosis of the external oblique muscle As a rule, it is more satisfactory to secure a patch of fascia lata, shaped to fit the hernial defect, from the middle of the lower third of the lateral aspect of the thigh The patch is trimmed and notched to fit snugly around the spermatic cord at the internal inguinal ring No fatty or loose areolar tissue should be left in the wound where the patch is to be fitted The patch is set in position and firmly anchored in place with interrupted sutures of fine silk or cotton to the lacunar and inguinal ligaments below Next the upper edge of the patch is tucked well up under the conjoined tendon, the transversalis fascia and the internal oblique muscle and fixed with interrupted stitches of fine silk or cotton The transversalis and internal oblique fascia are sutured over the fascia patch, but under the cord, to the inguinal ligament and Cooper's ligament, with interrupted stitches of silk or cotton

Fascial Flap Operation The cutaneous incision is made well to the medial side of the internal inguinal ring, a large square flap is lifted from the aponeurosis of the external oblique muscle, turned back and ligated and the hernial sac is excised The reflected flap is then passed under the cord drawn into its former position and sutured The wound is closed in the usual manner

Fascia Flap Combined with Cooper's Ligament Operation Recurrent indirect inguinal hernia is usually most satisfactorily repaired by the Cooper's ligament operation reinforced with a fascial flap from the rectus sheath A large semicircular flap of the rectus sheath is dissected from the muscle, turned down and sutured to Cooper's ligament The lateral leaf of the aponeurosis of the external oblique is slit and notched so as to fit snugly around the cord at the internal inguinal ring It is then carried under the cord and sutured to the transversalis beneath the internal oblique The medial flap of aponeurosis is brought down over the cord and sutured to the inguinal ligament

Cutis Graft Patch The cutis graft is readily available and may be used instead of fascia or tendon After the hernial sac has been dissected out and ligated, the edges of the fascia are brought together as well as possible with interrupted sutures of medium cotton or silk, a graft is taken from the wound flaps or from the anterior external surface of the upper third of the thigh The epidermal layer is cut away with a skin graft razor Then the skin graft is cut and shaped to fit the hernial defect and is securely sutured with interrupted fine silk or cotton stitches The fat should be removed from the graft as thoroughly as possible It is important to close the wound carefully and to leave no dead spaces or pockets that might increase the danger of infection The subcutaneous tissues and the skin are closed in the usual manner

Cannaday, who has had extensive experience with this method, cites the advantages of the cutis graft as follows It heals rapidly and well, it is strong and stable from the time of operation, it has great viability and is able to survive under adverse conditions, it possesses marked tensile strength, it has a good blood supply, and it assumes the function of the part it replaces, being gradually converted into fibrous tissue Cannaday also stated that in 125 operations there was only 1 complication—an epidermal cyst developing in the graft Behrend has used the whole skin graft most successfully It is severed from the skin overlying the sac

SUMMARY

The treatment of large and recurrent post-operative inguinal hernias is discussed, with emphasis on statistical results for different forms of treatment The Cooper's ligament operation, the use of the fascial patch and the fascial flap, and the cutis graft technic are described and their advantages evaluated

SOMMAIRE

L'auteur discute le traitement des hernies volumineuses et des hernies inguinales qui récidivent après traitement chirurgical. Il discute en détail les résultats de statistiques obtenus par différents procédés opératoires. L'opération du ligament de Cooper, l'emploi de lambeaux fasciaux et de greffons cutanés sont décrits et leurs différents avantages mis en valeur

RIASSUNTO

Discute la cura delle ernie inguinali voluminose e recidivanti, con speciale riguardo ai risultati dei diversi tipi di operazione. Descrive l'operazione del legamento di Cooper, mediante l'uso di lembi di fascie e di innesti cutanei Sottolinea i vantaggi di questo speciale metodo operativo.

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Full Thickness Skin Graft in the Repair of Voluminous Hernias

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PHILADELPHIA

EFFICIENT repair of hernia presents a problem that still calls for all the surgeon's ingenuity An operation which most frequently is a simple one, and one on which many a house officer has cut his surgical teeth, may present problems to tax the resources of the most skillful Hernia repair is usually based on the procedures originally described by Bassini[1], Halsted[2] or Ferguson[3]

Lately, the Cooper's ligament operation of McVay[4] has received favorable attention The difference in the various types of hernia repair are anatomic and will not be reviewed at this time In an effort to attain the ideal, several types of suture material have been advocated Catgut, ribbon gut, cotton, silk wire and autogenous and ox fascia sutures all have had or still have their champions[5]

An additional variation in the repair of hernia is the introduction of a tissue or material to the inguinal canal designed to strengthen the abdominal wall at its point of weakness Such materials as sheets of fascia cutis[6], and tantalum gauze[7] have been used for such purposes We wish to report our experiences and technic, making use of the full thickness skin graft as an adjunct in the repair of huge scrotal incisional hernias We wish to emphasize that we do not consider the skin graft technic universally necessary in the repair of hernia However, a hernia of enormous size has often been considered a contraindication to repair It is for this type of hernia that we have made use of the full thickness skin graft

Voluminous hernias occur through neglect, as a result of anatomic deficiency and following unsuccessful primary operation They are also seen in abdominal wounds following prolonged drainage and infection Undoubtedly, the number of cases of this type will grow less as infection is prevented or limited by sulfa drugs and antibiotics (Figs 1, 2 and 3)

Because of the impressive results obtained by the use of skin in grafts for war wounds[8] it occurred to us that skin might also have value when used as a graft in the repair of hernia Before using full thickness skin as a buried graft, it was important to study the effects of burial on the epidermis and also on the glands that lie in the dermis Consequently, strips of skin were excised from dogs and buried beneath the rectus fascia These were removed for study at intervals varying from two weeks to six months They invariably showed flattening and atrophy of squamous epithelium and hair follicles, increased fibrosis, and vascularization by ingrowth of capillary epithelium (Figs 4 and 5) The graft became homogeneously fused by fibrosis with the surrounding tissue, which is probably the secret of its value in hernia repair Wound infection did not follow burial of full thickness skin in any of the experimental animals

OPERATIVE TECHNIC

The skin over the operative site is prepared the day before operation with ether, alcohol and tincture of zephiran Penicillin administration is begun twenty four hours before operation On the operating table the skin over the hernia is scrubbed with soap and water for five minutes, this is followed by the application of ether and tincture of zephiran Instead of a linear incision two elliptic incisions are made the widest part of the ellipse measuring approximately 2 cm, and the skin between the incisions is excised Subcutaneous fat is removed with a curved scissors or knife and the skin is placed in a covered dish of saline solution This specimen is the tissue to be used as a graft The hernia is reduced and repair begun according to the surgeon's choice

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Read at the Thirteenth Annual Assembly of the United States Chapter International College of Surgeons St Louis November 1948

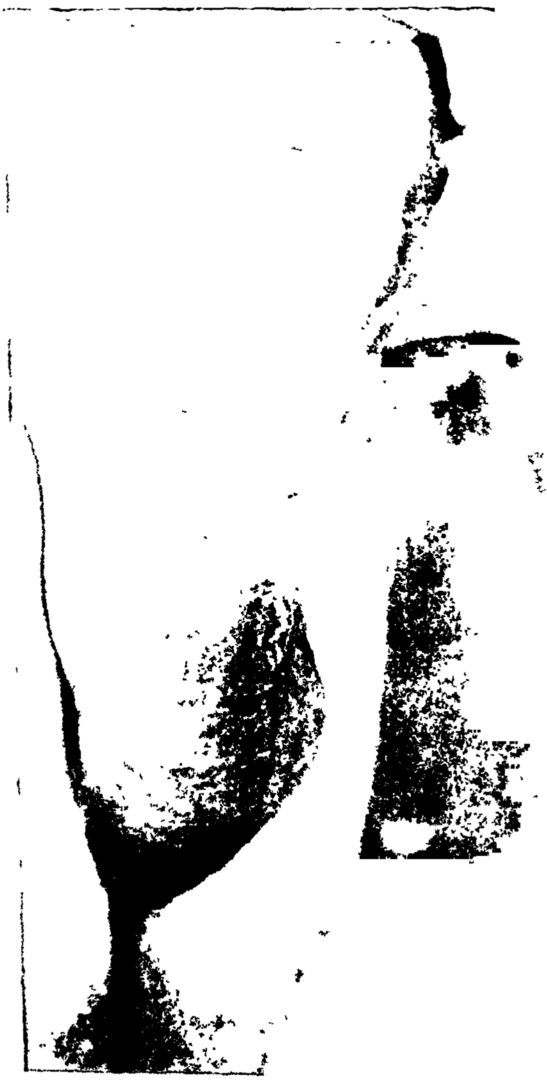

Fig. 1. Huge indirect scrotal hernia on right side, recurrent.

For primary repair, we usually choose McArthur's modification of the Halsted procedure. For recurrent hernia we employ fascial strips obtained from the fascia lata with a Masson stripper and alloy steel wire. The hernia having been reduced, its sac removed by excision [illegible] ligation, and the floor of the inguinal [illegible] described, the stage is now [illegible] of the skin graft. This is [illegible] desired size and may be [illegible] to permit extension of the [illegible] internal ring. Re- [illegible] point of weakness is [illegible] of skin to stretch [illegible] placed over the line of sutures joining Poupart's ligament to the conjoined tendon. The graft is held in place with interrupted wire sutures, the lowest being placed so that the lower end of the skin graft is sutured to the fascia overlying the pubic portion of the spine. The upper end is then anchored at the desired point, and intermediate sutures are placed as required (Fig. 6). The external oblique fascia is closed in the usual way. The skin is closed without drainage.

CLASSIFICATION AND RESULTS

Skin grafts to aid in hernia repair have been used in 16 cases since 1946. All of the patients were male; the youngest was 37 years old and the oldest 80. Eight of the lesions were indirect inguinal hernias; 3 were recurrent inguinal hernias (2 were twice recurrent); 1 was a recurrent femoral hernia (Fig. 3); 2 were bilateral direct hernias; 1 was a combined incisional and indirect inguinal hernia, and 1

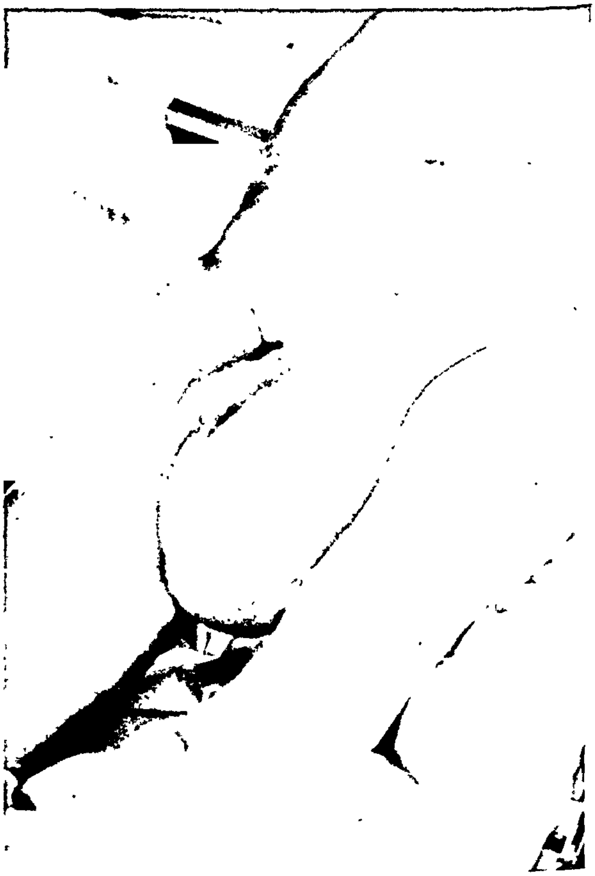

Fig. 2. Large indirect inguinal hernia.

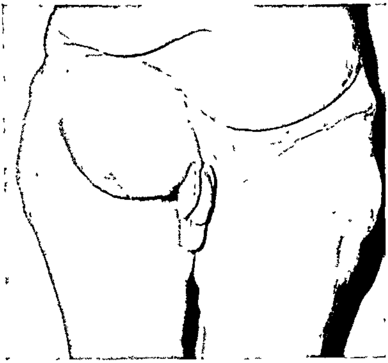

Fig. 3 Massive recurrent femoral hernia on right side; recurrent indirect inguinal hernia on left.

was a simple incisional hernia in an obese man. In 4 cases serous drainage was noted for four days to eight weeks after the operation There was no recurrence in any of these. One recurrence (6.2 per cent) has been reported to us by a patient who suffered a sudden violent strain when thrown to the pavement by a rising elevator, but the patient has not presented himself for examination.

SUMMARY

Voluminous primary or recurrent hernias, which in the past might have been considered inoperable because of size and tissue deficiencies, may be repaired when an autogenous full thickness skin graft is used to reinforce the area of weakness. Experimental studies have shown that the buried skin becomes homogeneously fused with the surrounding tissues

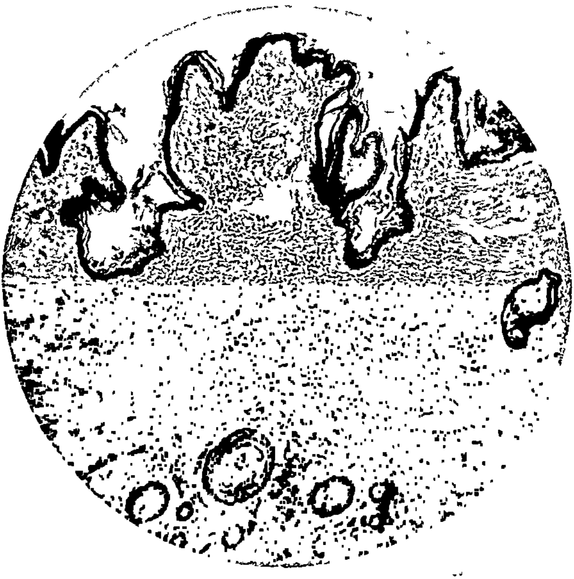

Fig. 4. Skin of dog, removed six weeks after burial under rectus fascia. Note atrophy of squamous epithelium, beginning fibrosis and atrophy of glandular structures.

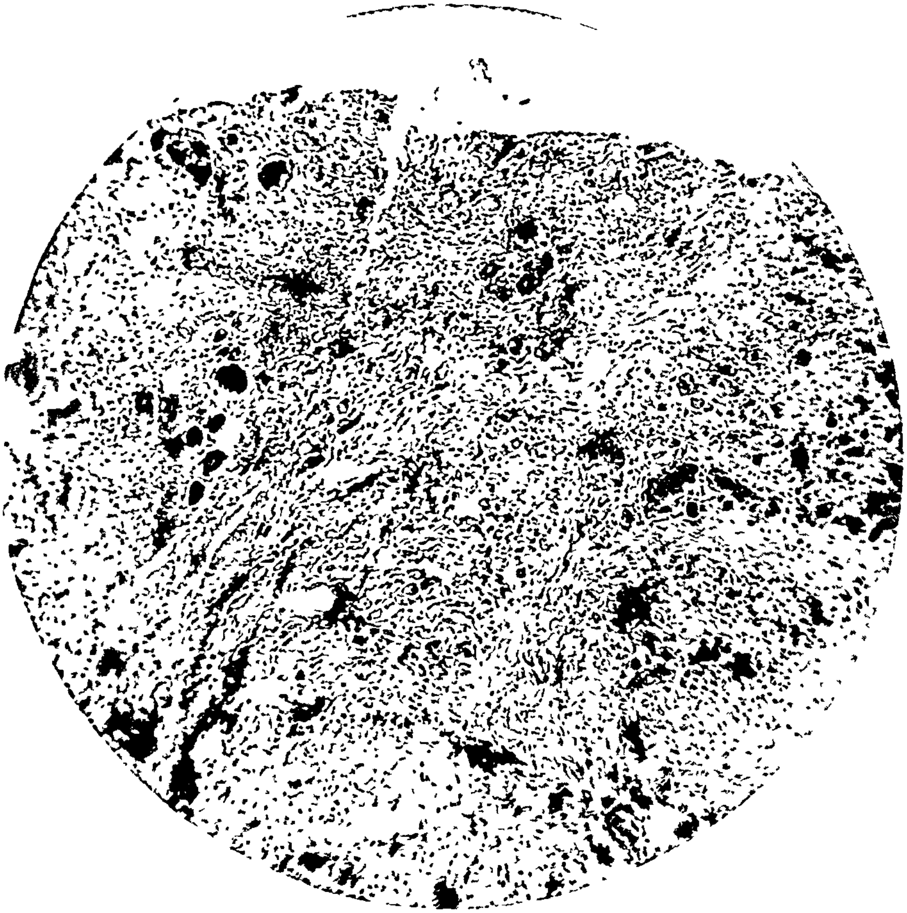

Fig. 5. Skin of dog, removed six weeks after burial under rectus fascia, showing definite fibrosis and atrophy of glandular elements.

The epidermis and glandular structures become atrophied, and the transplant assumes the structure of a layer of fibrous tissue. Sixteen patients have been operated on, with 1 recurrence (not confirmed). The only complication was wound drainage in 4 cases. This [illegible] with eventual healing.

SOMMAIRE

[illegible] ies volumineuses et celles [illegible] ns le passé furent [illegible] rables vu le volume [illegible] être réparées [illegible] autogène [illegible] able. Des [illegible] que la peau enfouie devient homogène en se fusionnant avec les tissus environants. L'épiderme et l'éléments glandularies s'atrophient et prennent la forne d'une couche de tissus fibreux. 16 malades ont été opérés, il n'y eut qu'une récidive (non confirmeé). La seule complication fut l'obligation de drainer la plaie dans quatre cas; même dans ces cas, la guérison fut complète.

RIASSUNTO

Ernie voluminose o recidivanti, che nel passato sarebbero state ritenute inoperabili per il volume e per la deficienza dei tessuti, oggi possono essere riparate mediante trapianti di pelle a tutto spessore onde rinforzare

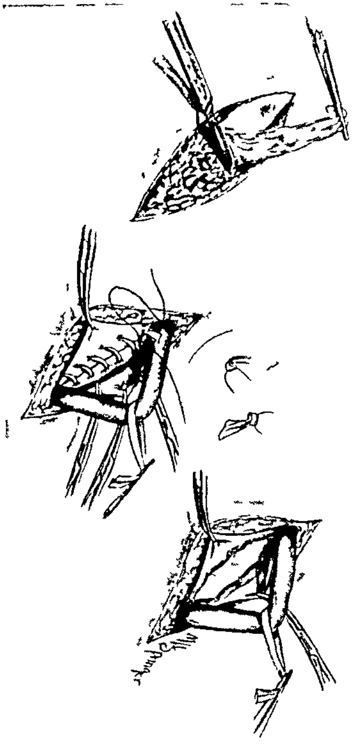

Fig 6 Top, excision of full thickness skin graft for future use Center, floor of inguinal canal secured with strip of fascia lata Bottom, suture of skin graft with alloy steel wire overlying floor of inguinal canal Fascia of external oblique muscle is then sutured over graft

la zona indebolita Indagini sperimentali hanno dimostrato che il trapianto cutaneo si fonde omogeneamente con i tessuti vicini L' epidermide e le ghiandole si atrofizzano, il trapianto assume la struttura di uno strato fibroso

Sopra 16 operazioni del genere e' occorsa una sola recidiva (non confermata) L'unica complicazione e' consistita nel drenaggio della ferita, che si e' ripetuto in 4 casi Cio' non ha *pero' impedito una completa guarigione*

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ADDENDUM

Seven additional patients have been operated upon since this paper was written No recurrences have been reported

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Present Status of Surgical Problem of Hyperplasia of the Prostate

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PROGRESS in surgical management of the prostate moves on. Various changes have taken place, and at present the obstructin gland is removed by the suprapubic, the retropubic, the perineal or the endoscopic route.

Transurethral resection is generally employed for surgical correction of smaller hypertrophies, although some urologists utilize it for total prostatectomy.

Meticulous preoperative preparation and postoperative care are still essential. The use of safer anesthesia, particularly intravenous pentothal sodium supplemented with oxygen, nitrous oxide, ether or cyclopropane, and curare when greater relaxation is required, has enabled surgeons to operate on poor cardiac risks as well as on patients with arteriosclerosis or hypertension. Sulfa and antibiotic therapy have further reduced infection, and all of this has lowered the rate of mortality and morbidity.

More precise diagnosis has enabled us to detect prostatic hyperplasia at an earlier age when operative risk is relatively less.

The purpose of this paper is to review the four methods of operation now utilized for removal of the prostate gland, pointing out advantages and disadvantages. A comparative review of patients operated on during the past [illegible] years will also be presented.

ETIOLOGIC CONSIDERATIONS

[illegible] of hypertrophy of the prostate, [illegible] accurate, hyperplasia, is not [illegible] understood. To date the most [illegible] is that of Deming and Moore. [illegible] have stated that hyperplasia consists of new growth [illegible] glandular tissues. [illegible] walls of the prostatic urethra and the vesical neck. Growth begins as a fibromyoma in the prostatic urethra and is soon invaded by the epithelium of the prostatic ducts. The epithelial element outgrows the fibromuscular, causing the full grown lesion to appear glandular. This benign overgrowth of the prostate consists of hyperplastic and not hypertrophic tissue; it is not invasive but always encapsulated. In growing, it compresses the uninvolved peripheral parenchyma, forming the so-called false capsule from which it is readily enucleated at prostatectomy.

Hyperplasia of the prostate usually appears in the fifth decade of life or later, although it may be observed in the fourth. This is possible because of advanced methods of diagnosis.

DIAGNOSIS

Rectal palpation is still the most valuable diagnostic procedure, and the physician should always include rectal inspection with routine physical examinations. In many cases, digital palpation of the prostate will reveal hyperplasia, and it is particularly indicated for patients presenting the classic symptoms of prostatism—frequency, dysuria, diminution in size, force and projection of the urinary stream, the sensation of not completely emptying the bladder, and retention of urine.

Occasionally the offending prostate will appear rather small, as most of the enlargement extends intravesically; but rectal examination with the shaft of the cystoscope or a sound in the bladder will reveal the thickening characteristic of prostatic enlargement. Cystoscopic study usually gives accurate information as to the size and obstructive features of the prostate. I prefer using the No. 20 (Charriere) McCarthy Panendoscope or the No. 17 Brown-Buerger cystoscope, because the smaller instrument is less likely to traumatize the obstructing gland. With the cystoscope one may observe back pressure changes, consisting of

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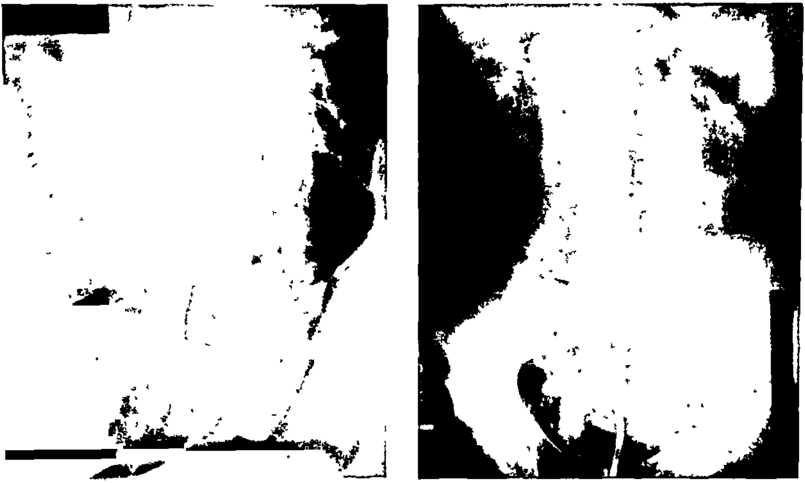
[illegible]



Left, retrograde cystogram taken in oblique position, showing pressure defect due to giant prostate weighing 100.5 Gm. Right, iodaerocystogram showing defect in base of bladder due to obstructing prostate weighing about 90 Gm.

hyperplasia of the trigone, trabeculations, cellules and diverticula.

For patients with large hyperplasias (grades 3 and 4) it is best not to use the cystoscope. Information should be gleaned by rectal palpation, retrograde cystographic study and intravenous urography. Lacunar cystography, promulgated by Pérez-Castro (injection of air and opaque iodine solution into the bladder) gives more accurate information as to the size, shape and extent of the obstructing gland. Intravenous urographic examination should be carried out in all cases. It reveals the functioning power and also discloses concomitant lesions of the kidneys, visualizes back pressure changes in the ureters and renal pelves. An excellent cystogram is often seen when the opaque solution entering the bladder visualizes the pressure defect caused by the obstructing gland in the base of this viscus. Occasionally a rather small hyperplasia will appear large on account of acute congestion. This condition should not be confused with true enlargement of the gland requiring surgical removal. Recheck examinations will reveal the exact nature of these, and they are best treated by endoscopic resection.

TECHNICS

Suprapubic Prostatectomy: A simplified method of suprapubic prostatectomy (modified Freyer operation) has given me great satisfaction and is accompanied by very low mortality and morbidity rates. For the majority of my patients, particularly those with large intravesical obstructing hyperplasias, I utilize this method.

In most cases a short midline incision (about 4 cm.) is employed. This heals rapidly. Should it break down, healing by secondary intention is not prolonged and hernia rarely occurs. In hundreds of prostatectomies performed in the past thirty years, I have not had a single persistent suprapubic fistula. In exposing the bladder, the peritoneum is peeled away from the dome of this viscus, care being exercised not to enter the prevesical space; this lessens the danger of infection of this susceptible cellular area. In making the incision well above the pubis, there is less likelihood of periosteitis pubica when infection is present.

While the surgeon is enucleating the gland, digital rectal counterpressure is carried out by a well trained assistant. I depend for hemostasis on the Pilcher or Brake bag, which is inserted immediately after enucleation, assuring minimal loss of blood. If there is undue hemorrhage, oxidized cellulose or gel is used. I rarely find it necessary to resort to wide exposure of the bladder in order to ligate bleeding points. After the operation, an indwelling urethral catheter is left in place from eight to twelve days, assuring the early closure of the suprapubic wound and minimizing the complication of urethral stricture. This simple method of suprapubic prostatectomy can be carried out with dispatch. It is accompanied with a minimal loss of blood and performed with a few instruments. It has given satisfactory results and our mortality rate during the past three years is 2.4 per cent.

I have not encountered many of the disadvantages ascribed to suprapubic prostatectomy. However, in the obese patient the operation is technically difficult. It is true that one is working in the bottom of a deep cavity and that maneuvers necessary to carry out enucleation of the gland are performed blindly, guided only by digital sensation. However, this need not be considered a disadvantage, as the well trained urologist can satisfactorily remove the entire gland just as if he possessed good vision of the operative field.

It is interesting to note that 96.7 per cent of the prostatectomies (open operation) carried out in the United States (de T. Shivers and Groom) are performed by the suprapubic route.

Retropubic Prostatectomy: Retropubic prostatectomy has gained considerable favor as [illegible] by Millin and others. Their [illegible] results have acted as a stimulus, and [illegible] operation is being performed by [illegible] the world. The approach [illegible] is unlikely to en- [illegible] bladder is not [illegible] complication of [illegible]. The operation has [illegible] carried out under direct vision and is particularly suitable for medium bilobular and trilobular hyperplasias. It resembles perineal prostatectomy, in which anatomic dissection is also carried out under direct vision.

Hemorrhage is readily controlled and one has the opportunity to repair the prostatic portion of the urethra and obtain secure closure of the prostatic capsule. Convalescence is smooth, as there is little likelihood of pelvic sepsis or excessive bleeding.

The operation has certain disadvantages, as it is difficult in the adipose patient and in patients on whom cystotomy has been performed; it is also contraindicated for patients presenting severe infection; it does not afford adequate access to the posterior aspect of the prostate, in the region of the membranous urethra, which is prone to invasion by early carcinoma.

A fairly late common complication is stricture of the vesical neck. However, this can be prevented by resection of a lip of vesicomucosal cuff at conclusion of the enucleation. Displacement of the catheter after operation may lead to unpleasant complications, such as hemorrhage, stricture formation, etc. It is agreed that the smaller hyperplasias, sclerosis of the vesical outlet and prostatic fibrosis are not amenable to retropubic prostatectomy and are best treated by transurethral resection. Large intravesical adenomas are more readily removed by the transvesical approach. Osteitis pubica may unquestionably prove a complication in cases of infection, because the operative field is in close contact with the pubic bones.

Endoscopic Resection of Prostate: In the United States, approximately 60 per cent of patients with prostatism are treated by endoscopic resection. Due credit must be given to Georges Luys, who called attention as early as 1914 to the excellent results obtained in carrying out "forage" of the prostate through his perfected cysto-urethroscope. His success was due to meticulous preoperative care and perfected technic. Recently this same operation was successfully carried out on Dr. Luys himself, and it was a source of great satisfaction to him.

Stern, Davis, McCarthy, Caulk, Emmett, Nesbit and other urologists popularized the operation in the United States. There is no question that it is an ideal operation for the smaller adenomas, sclerosis of the vesical neck and fibrosis of the prostate Some resectionists apply it to all types of hyperplasia, even attempting to remove the larger adenomas by resection claiming that they can carry out total prostatectomy through the resectoscope I reserve resection for the smaller adenomas and when the hyperplastic gland exceeds 30 gm I prefer enucleation

The technical removal of the larger hyperplasias is far more laborious than enucleation, but it is easier for the surgeon and certainly as easy for the patient

After resection, with patients presenting the larger types of hyperplasias, I have observed much recurrent hematuria, urinary retention, persistent pyuria and painful and frequent urination Some patients were able to urinate satisfactorily leaving little or no urine in the bladder However, varying degrees of cystitis persisted Many patients on whom endoscopic resection had been performed (elsewhere or by me) required subsequent prostatectomy, which permanently relieved the symptoms

Formerly it was thought that transurethral resection, properly carried out entailed less hazard than prostatectomy, and therefore, it was performed on the poor risk patient With improved anesthesia (particularly with pentothal sodium) and the use of sulfa and antibiotic therapy, this is no longer the case Most patients with prostatic disease may now be operated on with safety The poor cardiac risk, the diabetic patient and the patient with arteriosclerosis must be well prepared, but, in collaboration with a competent internist, I have carried many through prostatectomy These were patients on whom operation would not have been attempted heretofore

Perineal Prostatectomy Hugh Hampton Young, the great pioneer of American urology, popularized perineal prostatectomy in this country The operation has been carried out not only by his pupils but by other urologists In earlier days this method probably carried a lower mortality rate than did other current methods At present approximately 3 3 per cent of total prostatectomies are performed by the perineal route It is felt that this approach provides more satisfactory dependent drainage and permits better anatomic dissection and removal of the hyperplastic prostate under direct vision It also gives the surgeon a chance to inspect the gland for hard carcinomatous nodules and, if biopsy at the time of operation reveals malignant disease, radical prostatectomy may be performed Although the radical operation provides the opportunity of curing prostatic cancer by radical removal of the gland, it is of no value for occult cancer and does not provide for removal of regional lymphatics

The disadvantages of perineal prostatectomy are incontinence, loss of sexual power, persistent perineal fistula and occasional recto urethro perineal fistula Incontinence is due to injury to the external sphincter, loss of sexual power seems to be due to severance or injury of the nerves of the perineum and recto urethro perineal fistula results from injury to the rectum

During thirty years, in consultation, I have observed 5 cases of such fistula formation, in spite of the fact that the patients were operated on by well qualified urologists Three of these patients became bedridden The other 2 were finally relieved by a series of reparative operations, including cystotomy, colostomy, nephrectomy and plastic repair of the entire fistulous tract The incidence of fistula formation, incontinence and impotence following perineal prostatectomy explains why only 3 3 per cent of all prostatectomies carried out in the United States are done by the perineal route

The perineal operation is no longer considered necessary for the smaller obstructive fibrotic glands which are amenable to the simpler transurethral resection I reserve the perineal approach for radical prostatectomy in cases of early cancer and for removal of the hyperplastic gland presenting concomitant calculi

COMMENT

Every urologist should be trained to carry out suprapubic, retropubic and perineal prostatectomy, as well as endoscopic resection, in a competent manner The genitourinary surgeon should choose the method that involves for him the fewest complications and the lowest mortality rate As has been stated, many complications following prostatectomy and resection can be minimized by careful preparation of the patient, evaluation of each individual case and meticulous postoperative care. I have never seen nephrosis following transurethral resection, probably because I do not carry out extensive resection on larger hyperplasias.

Despite the opinion of certain prostatectomists who advise immediate operation without preparation, I feel that the mortality rate is reduced by careful preoperative preparation and meticulous postoperative care. Occasionally one encounters a good operative risk, with no infection and normal renal function, on whom it is safe to operate without preparation.

When resection is contemplated, progressive dilatation of the urethra to 30 Charriere should be carried out. This prevents rupture of the urethra and the unpleasant complication of stricture, which is due to trauma caused by forcing the resectoscope into a urethra not large enough to accommodate it. Patients presenting azotemia should be treated either by intermittent or retention catheter drainage. I seldom carry out the two-stage prostatectomy, reserving it for the case in which the retention catheter cannot be introduced or is poorly tolerated.

Postoperative infection of the bladder is minimized by simple, closed system of irrigation through a Y-drainage tube, with the use of 1:4,000 rivanol solution. When resection is employed, the retention catheter is left in place from three to five days; after prostatectomy it is removed in nine to fourteen days. This maintains adequate drainage, assures prompt wound healing and epithelization of the prostatic urethra or loge, and lessens the possibility of subsequent stricture formation.

ANESTHESIA

Improved anesthesia has reduced the mortality rate and gives surgeons the opportunity of operating on so-called poor risks who present [illegible] disease, diabetes, arteriosclerosis and [illegible]. The ideal anesthetic for the [illegible] elderly patient with prostatic [illegible] pentothal sodium, sup[illegible] by nitrous oxide and oxygen and [illegible] relaxation is required. [illegible] I pointed out that spinal anesthesia, even by the perfected method, is more likely to be accompanied by coronary occlusion. Faulk lists spinal anesthesia as one of the causes of disease of the coronary artery. I have encountered 5 cases in an eight-year period.

COMPLICATIONS

Hemorrhage: As loss of blood debilitates the patient, makes him more susceptible to grave complications and can prove fatal, I stress the importance of determining the bleeding time of all candidates for operation. All available prophylactic measures to prevent undue hemorrhage should be instituted.

The simplified suprapubic method of enucleation, which I carry out with dispatch, immediately inserting the hemostatic Pilcher or Brake bag, minimizes loss of blood. The hemostatic bag has a decided advantage, as it can be placed immediately in situ, before much blood is lost; it is easy to insert and prevents subsequent hemorrhage. Because of this bag we seldom have to resort to transfusion, but when an undue amount of blood is lost I do not hesitate to use it. Constant vigilance on the part of the urologic house staff is essential in coping with postoperative hemorrhage.

Infection: The intelligent use of antibiotic and sulfa therapy before and after operation has reduced infection and still further lowered the mortality rate. Patients are no longer lost because of septicemia, pyonephrosis or renal cortical abscess formation due to ascending infection; also, the incidence of pyelonephritis and overwhelming infection has been greatly reduced.

In the majority of cases orchiepididymitis can be prevented by vasectomy. Believing that antibiotics would prevent this complication, I did not carry it out in 20 consecutive prostatectomies in which penicillin had been administered. When epididymitis developed in 40 per cent of the patients in this group I realized that it is still necessary to carry out partial vasectomy.

Pulmonary Complications: In about 1 of 300 cases pulmonary embolus occurred, but its incidence was lower after transurethral resection than after prostatectomy. Early ambulation has materially aided in lessening the mortality rate. Pneumonia is a rare complication—only 1 case in the past three years And it seems less prevalent on the West Coast

MORTALITY AND MORBIDITY RATES

The following is a review of all prostatectomies carried out at the Southern Pacific General Hospital for varying periods during the past nineteen years Not included in this series are endoscopic resection for median bar and other small obstructions of the vesical neck One of the factors in the reduction of mortality rate is the expert postoperative care made possible by the establishment of a residency in urology

Table 1 Mortality Rate

	Prostatectomy, %	Resection %	Overall %
1929 1935	162 11 7	72 1 3	8 5
1936 1946	301 5 3	465 2 8	3 6
1946 1948 (2 yrs 10 mos)	123 2 4	354 1 1	1 4

Table 2 presents a list of the complications associated with 354 resections and 123 prostatectomies performed during the last two years and ten months

Table 2 Complications

Condition	*No of Cases*
Postoperative hemorrhage	
Following transurethral resection	10
Following prostatectomy	2
Thrombophlebitis	
Following transurethral resection	1
Following prostatectomy	3*
Prostatitis	
Following transurethral resection	3
Ventral hernia	
Following suprapubic prostatectomy (relieved by herniotomy)	2
Pulmonary embolus	
Following transurethral resection with spinal anesthesia (1 fatal)	2
Atelectasis and pneumonia	
Following transurethral resection with spinal anesthesia (fatal)	1
Ascending pyelonephritis	
Following transurethral resection	1
Cardiac decompensation	
Following transurethral resection with spinal anesthesia (fatal)	1
Following prostatectomy (pentothal sodium anesthesia) (fatal)	1
Coronary occlusion	
Following prostatectomy with spinal anesthesia (fatal)	1
Following transurethral resection (spinal)	1
Perforation of bladder	
Following endoscopic resection with spinal anesthesia (fatal)	1
Perforation of urethra	
Following endoscopic resection with spinal anesthesia	1
Shock	
Following prostatectomy with pentothal sodium anesthesia (fatal)	1
Urethral stricture	
Following transurethral resection with spinal anesthesia	1

In estimating mortality rates we included all hospital cases in which operative intervention was directly or indirectly responsible for death Five deaths followed spinal anesthesia, and 2 followed pentothal sodium anesthesia This bears out our opinion that pentothal sodium anesthesia is less hazardous in the elderly debilitated patient with prostatic disease In 3 cases the cause of death was verified by autopsy To lower future mortality rates, we analyzed the causes of death (Table 3)

Table 3 Analysis of Deaths

After Prostatectomy	
Shock	1
Cardiac decompensation	1
Coronary occlusion	1
After Transurethral Resection	
Perforation of bladder	1
Cardiac decompensation	1
Pulmonary embolus	1
Pneumonia and atelectasis	1

SUMMARY

The author reviews progress in the surgical management of hyperplasia of the prostate and discusses the four methods now being utilized

Benign overgrowth of the prostate consists of hyperplastic but not hypertrophic tissue, is not invasive but always encapsulated and should be referred to as hyperplasia rather than hypertrophy.

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*In 2 cases thrombophlebitis occurred in spite of early ambulation

Careful examination (including cystoscopy and retrograde cystography) is stressed and rectal palpation recommended as still a most valuable diagnostic procedure that should be included in all physical examinations. Intravenous urography should be carried out in all cases.

In the United States approximately 60 per cent of patients with prostatic disease are treated by endoscopic resection. Ninety-six and seven-tenths per cent of all open prostatectomies are performed by the suprapubic route. A simplified and satisfactory method of suprapubic prostatectomy is described.

The perineal operation is advised for radical prostatectomy in cases of early cancer and for the removal of hyperplastic glands presenting concomitant calculi.

Retropubic prostatectomy is becoming popular because the direct approach provides for anatomic dissection under direct vision, eliminates opening of the bladder and does not endanger the rectum.

The ideal anesthetic for the elderly and debilitated patient is intravenous pentothal sodium, supplemented by nitrous oxide and oxygen and by curare when greater relaxation is required. It is particularly indicated for the poor cardiac risk, the diabetic patient and patients with arteriosclerosis and hypertension.

Urologists should be trained in the performance of all methods, and the genitourinary surgeon should choose the operation with which he achieves the lowest complication and mortality rates.

The author recommends prostatectomy for the larger and transurethral resection for the smaller hyperplasias (30 Gm. or less).

Mortality has been reduced by early diag- [illegible] safer anesthesia, antibiotics and sulfa- [illegible] careful preoperative preparation and [illegible] postoperative care. A comparative [illegible] of the mortality rate of [illegible] during the past nineteen [illegible] Southern Pacific General Hospital.

[illegible]

[illegible] les progrès accom- [illegible] de l'hyperplasie de la prostate et discute trois méthodes actuellement en usage.

Les augmentations bénignes du volume de la prostate sont des hyperplasie et non des hyperthrophies. Le tissu hyperplasique n'envahit pas les tissus environnants mais reste encapsulé. Ce sont des hyperplasies et non des hyperthrophies, Un examen soigneux par la cystoscopie et la cystoscopie rétrograde est important. L'auteur recommande la palpation rectale comme un procedé de grande valeur diagnostique. Le devrait être employé dans tout examen physique. L'urographie intraveineuse doit être pratiquée dans tous les cas. Aux Etats Unis, approximativement 60% des malades souffrant de la prostate subissent la résection endoscopique; 86.7% des prostatectomies furent effectuées par une prostatectomie suprapubienne. L'opération périnéale est recommandée pour la prostatectomie radicale dans tous les cas de cancer précoce et pour l'ablation de glandes hyperplastiques renfermant des calculs. La prostatectomie rétropubienne devient populaire parce que cette voie directe permet une dissection anatomique sous vision directe. Elle élimine l'ouverture de la vessie et ne met pas en danger le rectum. L'anesthesique idéal pour les vieillards et pour les affaiblis est le sodium penthotal intraveineux anguel, on afoute l'oxide nitreux et l'oxygene et aussi le curare quand il est nécessaure d'obtenir un relachement plus complet. Il est surtout indiqué pour les cardiaques, pour les diabétiques et pour les malades présentant de l'artériosclérose et de l'hypertension.

Les urologistes doivent être entrainés à l'emploi de toutes ces méthodes et le chirurgien génitomrinaire doit choisir l'opération qui donne le moins de complications et la mortalité la plus basse. L'auteur recommande la prostatectomie pour la prostate volumineuse et la résection transuréthrale pour les petites hyperplasies (30Gr ou moins).

La mortalité est moindre de nos jours, dûe à un diagnostic précoce à une anesthésie mieux comprise, à l'emploi d'antibiotiques et de sulfo thérapie et aussi à la preparation préopératoire soignée du malade et aux soins postopératoires méticuleux qu'on lui donne. L'auteur passe en revue le taux de mortalité des malades opérés durant les dernières dix-neuf anneés à l'hopital Southern Pacific General.

RIASSUNTO

Passa in rassegna la cura chirurgica dell'iperplasia prostatica, discutendo i quattro metodi operativi comunemente adottati

Un aumento di volume della prostata carattere benigno implica non una vera ipertrofia, ma un'iperplasia della ghiandola, la quale rimane sempre limitata dalla capsula

Sottolinea la necessita' di un esame accurato (*che includa la cistoscopia*) la palpazione rettale rimane il metodo diagnostico fondamentale, che dovrebbe essere incluso in ogni visita medica *Oltre a cio', raccomanda sempre* una pielografia endovenosa

Negli S U il 60%, circa, dei pazienti colpiti da affezioni prostatiche vengono curati con una resezione endoscopica Nel 96 8% delle prostatectomie operate a cielo aperto l'operazione viene eseguita per via sovrapubica La via perineale e' indicata nelle prostatectomie per carcinomi iniziali e per iperplasie prostatiche accompagnate da calcoli La prostatectomia retropubica va guadagnando maggiore favore, perche' consente un'accurata ispezione della ghiandola durante la sua discissione, perche' evita l'apertura della vescica, perche' non espone a lesioni il retto

Raccomanda vivamente per i vecchi, per i cardiaci, per i diabetici e per i pazienti con ipertensione arteriosa l'anestesia endovenosa con pentotal sodico, combinata eventualmente con ossido nitroso ossigeno o con curare qualora necessiti un maggiore rilasciamento muscolare

L'A raccomanda la prostatectomia per le iperplasie piu' voluminose la resezione transuretrale per quelle piu' piccole (30 gr o meno) L'urologo dovrebbe essere comunque in grado di affrontare qualsiasi metodo, scegliendo quello che—nelle sue mani—offre le minori complicazioni e la piu' bassa percentuale di mortalita' Questa e' stata notevolmente ridotta da una diagnosi piu' precoce, da un'anestesia piu' perfetta, dall'impiego di antibiotici e dalla sulfaterapia, da un'accurata preparazione preoperatoria degli ammalati e da una meticolosa assistenza postoperatoria

La percentuale di mortalita' registrata negli ultimi 19 anni nell'Ospedale Generale del Sud Pacifico viene in ultimo confrontata con altre statistiche

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Curare and Shock

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ALTHOUGH the results obtained from the use of curare in anesthesia are encouraging and the practice is now extending to all countries, more than one voice has arisen recently to criticize the "rosy enthusiasm" that has accompanied it. Some say that more deaths are caused by curare than by chloroform and consequently that, though the advantages to the surgeon and the anesthetist are obvious, the use of curare is probably more harmful than helpful to the patient. Gray and Halton[1] have stated that this "milestone of anesthesia" is likely to become a tombstone if the physiologic effects of curare are not thoroughly studied.

It is therefore essential to approach the question from a biologic standpoint. Fundamentally the problem is one of experimental research.

The relation between curare and shock presents a problem of interest not only in surgical practice but in study of the pathogenesis of shock, because, in accordance with a hypothesis presented by us in other articles, shock may be due to the mediation of acetylcholine. Observations on the question have been vague, so that the place of curare with respect to existing and impending shock has not been determined. Nevertheless, the opinion has repeatedly been expressed that curare in the usual doses given in anesthesia exerts a protective action against shock (Gray and Halton[1]; Merle d'Aubigne and Kern[2]; Bracale and Lezza[3]). This action has been recognized by the fact that long and traumatic operations proceed rather benignly in curarized patients, so that curare is now freely used for poor risk patients who are predisposed to shock. The explanation commonly given is that curare, inducing a light narcosis, renders possible an economy of anesthetics. On the other hand, it was noted by Forrester[4] that tubacurarine improved the circulatory condition of patients who had not reacted to transfusion and other measures directed toward the elimination of shock. It may, therefore, become necessary to admit that curare has a direct and specific action.

As a complement to these clinical observations, experimental research has demonstrated that curare, injected slowly and in moderate doses, does not affect the circulatory condition, while in larger doses it is able to cause a fall, even an irreversible fall, of blood pressure (Heymans[5]; MacIntyre[6]). Till now, however, the possible action of curare on existing or impending shock and the chemical modification it may produce in the blood, have not been investigated.

This important problem presents two aspects, clinical and experimental. From the clinical point of view, few elements likely to throw any light on the matter have resulted from practice with curare in the Surgical Clinic of Naples. Generally, anesthesia has proceeded without notable changes in blood pressure. In only 2 cases was the possibility of pressure changes due to curare taken into consideration. Both patients were women and in both cases cholecystectomy was performed. General anesthesia was administered by a well-known English anesthetist, who used pentothal, cyclopropane, nitrous oxide, oxygen and 15 mg. of tubarine in a single dose. Serious shock occurred in both patients, resulting, it was thought from the anesthesia—possibly an excess of anesthetics or a harmful effect of curare.

Convinced, however, that when curarization is carried out in man in the course of anesthesia especially with combined anesthetics it is difficult to reach a clear solution of the problem, we decided upon a plan of experimental research to obtain definite answers to the following questions:

1. What changes in blood pressure and blood chemistry are produced by curare in

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[illegible] Annual Assembly of the United [illegible] College of Surgeons, St. [illegible]

[illegible] University of Naples, Italy.

animal experiments, in relation to dosage, modality, and speed of administration?

2 What action is curare capable of exerting in the prevention of shock? What is its effect on existing shock?

Our research was carried out on large rabbits with Wellcome tubarine The blood pressure was recorded with a kymograph inserted in the carotid, research on the blood included determination of changes in the blood count and in the values for hemoglobin, protein, and cholinesterase, which last is the specific ferment of acetylcholine The following results were obtained

A Blood pressure and chemical modifications induced by tubocurarine*

1 The use of tubocurarine is a very delicate procedure, both because of the great differences in individual tolerance and because of the serious consequences that may follow minor errors of technic

2 Injected slowly and in small doses, tubocurarine produces blood pressure and chemical changes of moderate intensity and short duration The blood pressure may show a minor rise or fall, but in a short while it becomes normal

3 With higher doses (a single but large dose, or repeated small doses), with too rapid injections, or even with moderate doses when given to particularly sensitive animals disturbance of the central nervous system manifests itself in convulsions, and a serious fall in blood pressure, sometimes very sudden and sometimes irreversible, may occur In one animal, bursting of the heart (right ventricle) occurred during the convulsions The fall in blood pressure is usually accompanied by the humoral changes (hemoconcentration and hyperproteinemia) known to be characteristic of shock, so that we may speak of a true curare shock due to excessive dosage or individual intolerance

From the clinical point of view, these experiments showed that (*a*) there is a wide variation of individual tolerance to tubocurarine, which requires much care in administration, (*b*) In the majority of cases curare, in appropriate doses does not induce important blood pressure and chemical changes, and (*c*) There is always a possibility of accident due to hyperdosage or individual hypersensibility

B To determine the relation between tubocurarine and traumatic shock,[8] two types of experiments were undertaken (1) subjecting curarized animals to prolonged evisceration, sometimes accompanied by hemorrhage capable of causing shock, and (2) injecting tubocurarine into animals in a state of serious shock caused by evisceration with or without hemorrhage The results of these experiments are as follows

1 Curare in moderate and repeated doses prevents shock, it is however, necessary to avoid overdosage

2 In animals in a state of serious shock, curare in moderate doses exhibits a sure effect in raising blood pressure and in eliminating shock, even when the blood pressure is so low that the animals are considered, judging from past experiments, very unlikely to recover

Referring to clinical practice, these experiments show that (*a*) curare is able to prevent shock due to evisceration and hemorrhage, which may occur in operations, and (*b*) when shock exists, curare can act efficiently in its elimination

In order to explain the mechanism by which curare exerts its action both in the prevention and in the elimination of shock, we have found a clue in the activity of cholinesterase, since a decrease in this factor usually accompanies shock (as we have already widely shown[9]) This decrease is, if not prevented, at least reduced by curare It is therefore possible to argue that the antishock activity of curare is a specific property altogether independent from the saving of anesthetics that accompanies its use, this activity probably results from *an interference in the acetylcholinesterase system* This antishock activity, exerted by a typically anti acetylcholine substance, would seem to confirm the hypothesis put forward by us in former articles [10] that, in the pathogensis of shock, the determining factor is the mediation of acetylcholine, which is in fact, blocked by curare

SUMMARY

In the field of clinicoexperimental investigations the relation between curare and shock is important not only in surgical practice but also in the study of the pathologic nature of shock Experiments performed by the authors on rabbits led to the following conclusions

1. Curare in moderate and repeated doses prevents shock; it is, however, necessary to avoid overdosage.
2. In animals in a state of serious shock, curare exhibits a sure effect in raising blood pressure and in eliminating shock.

From this research it is possible to argue that the antishock activity of curare is a specific property, probably resulting from interference in the acetylcholinesterase system. This antishock activity, exerted by a typically anti-acetylcholine substance, confirms our hypothesis that, in the pathogenesis of shock, the determining factor is formed by the mediation of acetylcholine, which is, in fact, blocked by curare.

SOMMAIRE

Dans les recherches clinicoexperimentales sur les rapports existants entre le curare et le choc, il est important de considerer non seulement la pratique chirurgicale mais aussi l'étude de la nature pathologique du choc. Les recherches faites sur des lapins entraînent les conclusions suivantes: 1)—Le curare à doses moderéés et répétées previent le choc. Il est neánmoins, nécessaire d'éviter de trop grandes doses. 2)—Chez les animaux en état de choc sérieux, le curare augmente la pression artérielle et élimine le choc. De ces recherches, il est permis de conclure que l'activité anti-choc du curare est une propriété spécifique résultant de l'interférence dans le système acethylocholisnesterase. Cette activité d'anti-choc exercèe par une substance anti-acéthylcoline typique confirme notre hypothése que dans la pathogénie du choc, le facteur déterminant est forme par l'intermediaire de l'acéthylcholine qui en effet est bloque l'par le curare.

RIASSUNTO

I rapporti fra shock e curare sono importanti non solo nella pratica chirurgica, ma [illegible] nello studio clinico-sperimentale dello [illegible]

[illegible] condotti dall'A. sopra il con- [illegible] i seguenti risultati:

1. In dosi moderate e ripetute il curare previene lo shock: e', ad ogni modo, necessario evitare un olosaggio troppo elevato.
2. Guariscono con il curare anche gli animali in grave stato di shock. La pressione del sangue risale rapidamente.

Questi risultati dimostrano che l'attivita' antishock del curare deriva de una proprieta' farmaco-dinamica specifica, con tutta probabilita' legata ad un'influenza sopra l'acetilcolesterinasi. L'attivita' antishock, esercitata da una sostanza tipicamente anti-acetilcolina, conferma l'ipotesi avanzata dall'A., secondo la quale nella patogenesi dello shock il fattore scatenante si formerebbe attraverso la mediazione dell'acetilcolina, affettivamente bloccata dal curare.

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Headache

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ONLY the chronic or relatively long standing types of headache will be discussed here Even under this limitation I shall be forced to omit many important clinical syndromes There is probably no subject in the medical literature that has been so extensively explored as that of headache A book written many years ago by an old friend of mine, Dr Curtis Hill, is entirely confined to the causes and treatment of headache Another friend of mine began to write an exhaustive treatise on the subject and gave up in despair when he found, in a cursory review of the modern literature, more than 1,000 causes of headache Perhaps it would be best to define the term

Anatomically, a headache may affect any of the structures above the neck, commonly speaking, however, the term does not include pains that affect the structures below the eye sockets in front and the nape of the neck posteriorly It is confined to discomforts in the general region of the cranium Again, the definition of headache should include only the type of discomfort generally described as an aching pain, and not the sharp, shooting, stabbing attacks usually attributed to irritation of the nerve roots—the pains customarily referred to as neuralgia This definition eliminates the commonly known neuralgias, such as tic douloureux, glossopharyngeal neuralgia, toothache, the pain of salivary calculi, cancer involving the nerves and similar conditions

Migraine, on the other hand, truly represents the type of headache to be discussed in this paper Migraine, usually described by the laity as "sick headache," is extremely widespread It accounts for the multitude of headache remedies on the market and for their tremendous sale

Only when a patient suffers from migraine in an aggravated form does he seek medical care, surgical treatment and psychotherapy Comparatively speaking such a patient is rare Uncounted numbers of our population suffer from this disease in a minor (subclinical) form and never seek the advice of the physician These persons keep a bottle of analgesic tablets of some kind on the medicine shelf and a small tin box of tablets in the coat pocket or purse Migraine in its mildest form is manifested only by slight supra orbital neuralgia, which may last for only an hour or two and may be completely relieved by one analgesic tablet In its more aggravated and typical form migraine is characterized by a severe headache difficult to control It may be limited to one side or both sides of the forehead and sometimes the entire top of the cranium When it takes the form of the "half head" headache, it is usually described as running from the front to the very back of the head, being most severe just above the eye and back of the ear The eye socket itself may be involved in the distress and there may be lacrimation associated with congestion of the conjunctiva and nasal mucosa the latter indicated by stuffiness of the nose There are other locations for the discomfort just described, such as the lower part of the neck, the shoulder, the entire arm, sometimes the upper teeth and upper jaw, and even the upper portion of the cheek Rarely does it affect the lower jaw Paresthesias may be described, accompanying the typical cephalgia, or without it, in other parts of the body, there may be attacks of complete hemi paresthesia or more commonly peculiar sensory phenomena limited to one extremity Frequently there are associated visual disturbances, such as scintillating scotoma, attacks of homonomous hemianopsia and many other subjective phenomena

The discomfort of migraine comes on in attacks, although at times these occur at such close intervals that the distress seems continuous over many days, weeks or months Typically, however, an attack lasts only through a day, and in many instances only a few hours Occasionally an attack continues

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[illegible] Jefferson Medic[illegible] [illegible] of the United St[illegible] Surgeons St [illegible] for several days, perhaps extending even to a week, but this severe form of the disease is uncommon.

The victim of migraine soon learns when an attack is impending; he notes a lack of energy and a general feeling of irritability. The headache itself is insidious in onset and may exist for some hours before it develops to a point where it becomes acutely disagreeable. It keeps on building up, so to speak, and increases in severity until, usually within two or three hours, it reaches its climax. At this point it may persist at its maximum severity for a number of hours and then gradually decrease, leaving the patient nauseated, mentally irritated and exhausted. Quite commonly this continues throughout a day, disappearing at night, and the patient arises the next morning in his customary good health. He learns readily enough that, during the attack, seclusion in a darkened room, well insulated from noise and responsibility, is the most valuable adjunct to analgesic therapy.

Attacks of migraine usually start during childhood or adolescence but are not severe enough to be noted until after the fourth year. Frequently the condition does not manifest itself until adolescence or early adult life. Excitement, fatigue, menstrual disorders, and business and financial responsibilities seem to be aggravating factors. Migraine is said to occur almost entirely in persons of superior mental makeup, the so-called intelligentsia, and especially in those who have assumed unusual social and business responsibilities. This may or may not be true. It is my opinion that if persons in other social strata were closely investigated it would be found that migraine is no respecter of social caste.

The diagnosis of migraine must depend entirely on the patient's description of his discomfort, since the symptoms are almost entirely subjective. There are no laboratory or [illegible] diagnostic tests. In some cases, however, it may be necessary to take roentgenograms of the skull, examine the spinal fluid, [illegible] pneumoencephalography to [illegible] the trouble is not due to an [illegible] occupying lesion, syphilis [illegible] disorder.

[illegible] symptomatic, and de- [illegible] important Since there is no specific treatment for migraine, symptomatic treatment over a long period becomes all the more important. This consists of psychotherapy, the administration of analgesics, and appropriate care of the patient during the attack. Mild attacks can be controlled by one of the salicylates, such as acetylsalicylic acid (aspirin); this drug may have to be taken every two or three hours in doses of 10 grains, and it is an extremely valuable remedy for this disease. If this does not give satisfactory relief, it is well to try ergotamine tartrate (gynergen) in doses of 0.5 or 1 mg.; a tablet is given at the onset of the headache and may be repeated in an hour if necessary. Probably not more than 4 or 5 mg. of this drug should be given in twenty-four hours since it is decidedly a vasoconstrictive agent. Ergotamine tartrate plus aspirin in doses ranging from 10 to 15 grains, often is effective when neither of these drugs alone will serve. It may be necessary to add codeine, (½ to 1 gr.; 0.06 to 0.12 Gm.) to the aforementioned medication when the attacks are severe. A hypodermic injection of ergotamine tartrate is sometimes more efficacious than are tablets taken by mouth. Attacks may be so severe as to require the use of a powerful narcotic, such as morphine. This should be avoided, however, if at all possible, because it is apt to produce excessive nausea following relief from the headache.

Psychotherapy, in the form of repeated assurances that the patient has no incurable, devastating disorder, is needed over a long period and is an essential part of the treatment. The patient should be assured that his attacks will not continue to be severe throughout life and that, as age advances, there is a strong tendency for the pain to disappear entirely. I have noted that when the headaches begin early in life there is a tendency for them to disappear earlier than when they have their onset well past middle age. In elderly persons the headaches are likely to continue throughout their lives, but middle-aged persons may hope for entire relief. This usually occurs between the forty-fifth and the fiftieth year; and it is uncommon for the disease to persist beyond this age.

Psychotherapeutic measures include an attempt to relieve the patient of worries, heavy social or financial obligations and excessive mental fatigue During the attack he should be confined in a closed, quiet, darkened room and freed of all annoying social responsibilities An ice cap often gives great comfort when applied to the areas most severely affected

There are many so called atypical head and face pains, regarded as separate clinical entities, that are probably nothing more than atypical migraine These include the sphenopalatine neuralgia of Sluder, erythromelalgia, post traumatic headache and numerous other ill defined pains in the face and cranium All have the same characteristics as migraine, they come on in attacks, leave for great lengths of time and have a strong tendency to cease completely during the fourth or fifth decade of life They vary from migraine only in the severity of the attack, having a tendency to be sharp and piercing and to be localized in parts of the face that are not customarily associated with the major discomfort of migraine However, if one closely analyzes the syndrome of sphenopalatine neuralgia and compares it with that of migraine one has an extremely difficult time in differentiating between them The same can be said of many of the other segregated clinical entities mentioned, when their characteristics are critically compared to those of chronic sick headache All these disorders are amenable to the symptomatic treatment used for comforting the migrainous patient For these typical headaches, as well as for migraine, any more than a specific cure is yet to be discovered

Post traumatic headache particularly has been confused with migraine If the history of trauma is eliminated it will be seen to have precisely the same characteristics as chronic sick headache Neurosurgeons have long wondered why one patient can undergo an extensive craniotomy, or some other type of operation requiring heavy blows and hammering of the skull, and not have post traumatic headaches, while another who has suffered a rather slight blow to the head perhaps a minor fracture, complains bitterly of headache resulting therefrom When one closely analyzes a so called post traumatic headache, it can be easily seen that it is, in fact, migraine Careful questioning often elicits a history of chronic headache for many years prior to the injury, the injury may have aggravated it but it certainly existed long before Usually there is also a familial history of sick headache

Surgery at present offers nothing in the treatment of the headaches mentioned Certain procedures ameliorate the symptoms in some cases Spinal puncture, for example, will stop the headache immediately in many patients and I treated one physician who had permitted 280 spinal punctures for relief of these attacks Pneumo encephalography is known to control the attacks for a time Even craniotomy has been observed to lessen the attacks and sometimes stop them completely

The efficacy of these nonspecific operations can be explained only on the basis of psychotherapy, or the general upset in the physiologic function of the cranial cavity, which temporarily alters in some way the mechanism of the disease This mechanism is not fully understood at present The best explanation is that the headaches are caused by vasodilation of the larger vessels to the brain This, however, does not account for the periodicity of the disease, nor does it yet point to any specific therapy Ligation of the arteries supplying the painful areas occasionally has seemed to stop the pain This type of therapy has not been applied, however, to the larger vessels supplying the brain, such as the vertebral and carotid arteries, which may well be the vessels implicated in the disorder Section of the large sensory roots supplying parts of the head have in no way affected the disorder It might be thought that section of the fifth cranial nerve, which supplies sensation to the greater part of the cranial cavity and face, would in some instances ameliorate the discomfort of these disorders, but this has been tried in numerous cases and has invariably failed Even when the pain is severest in the supra orbital region, involving the supra orbital nerve area, a complete section of the fifth cranial nerve, producing complete analgesia of the entire side of the head, will not stop the discomfort It seems that either the pain originates in the sensory cortical center itself or else the sensation [illegible] ough the nerves of the blood [illegible] enter the brain by the u

It is a well known fact that the blood vessels of the brain are well supplied with sensory nerve filaments. As evidence of this, injection of diodrast into the carotoid arteries with the region under local anesthesia causes a severe, sharp, agonizing headache, which passes off as soon as the drug passes through the vascular system.

In view of the fact that there is no specific therapy for any of the atypical types of headache, one must resort to the symptomatic relief of these disorders by general medical means.

Chronic sinusitis is often given as the reason for prolonged or recurrent headaches. However, when a headache persists after adequate sinus drainage and treatment by a competent rhinologist, the cause of the distress is much more likely to be due to some other disease, such as migraine. A patient with a so-called nasal headache that is not of nasal origin may frequently be relieved by cocaine applications to the nasal mucus membrane by systemic absorption of the drug. Since aspirin tablets are sufficient to give relief from migraine in many instances, one can easily see why even a trivial dose of cocaine is more effective. In many cases this has led to mistaken ideas as to the origin of headache. I am quite certain that the application of cocaine to the nose in the area of the sphenopalatine ganglion is no accurate test for differentiating between migraine and nasal headache An accurate history of the so-called sinus headache will give the true nature of the disorder, and the opinion of an expert rhinologist is indispensable in making the diagnosis Perisinal osteomyelitis and pus formation, particularly between the dura and the sinus may be the cause of distressing headache This pain is persistent and is accompanied by a febrile reaction; the patient shows the exhaustion and illness of a person suffering from a suppurative disease. The [illegible] said of infection around the [illegible] for which removal of the in[illegible] parts is indicated and usually [illegible]

[illegible] originating as a result of [illegible] or drug toxemias, is highly [illegible] mentioned here only [illegible] type of headache [illegible]ation of the patient for other indications of inflammatory disease or drug toxemia. For example, a headache in a person who is working in the vicinity of toxic gases or poisonous drugs, such as lead, carbon monoxide, etc., can easily be identified by the patient's occupation; also, persons with malaria, undulant fever, tuberculous meningitis, etc., have the earmarks of these inflammatory bacterial diseases. Treatment of this type of headache, therefore, resolves itself into treatment of the specific disorder.

It is now appropriate to consider the large group of neurosurgical disorders that cause headache of the chronic type. This headache is entirely different from that associated with the clinical entities previously mentioned. Pain due to brain tumor is the commonest example. In most cases the headache of brain tumor has not been present for many years as is the case with migraine; it is measured in terms of weeks, months, or at the most a few years. It is always limited to the cranium, involving the orbit and occasionally the upper jaw, but never the neck or the arm. It begins as a minor headache and gradually increases in severity with each attack until it becomes continuous. However, this continuous headache occurs only in the late stages of brain tumor; earlier, remissions of pain are quite the rule and must not mislead the physician into believing that brain tumor does not exist. There may be personality changes due to a brain tumor, such as euphoria, irritability and confusion. In the late stages there is stupor and even coma, and coincidentally the headache becomes constant and excruciating. The important thing to remember is that the headache of brain tumor increases in severity gradually with each attack and does not involve the many peculiar mental and physical disturbances characteristic of the migraine headache with which it is so often confused. Certainly when a headache develops that persists and gradually increases in severity within a period of one or two months, it should be determined whether a brain tumor is the causative factor. Sometimes, as has been said, this differentiation requires examination of the spinal fluid and even pneumo-encephalography. At least a differential diagnosis should be made by one who is constantly dealing with these lesions, the two diseases being so similar at times as to be almost indistinguishable. When the headache of brain tumor exists for any great length of time, its periods of intensity are likely to be associated with somnolence, confusion, and nausea. With brain tumor, headache may persist for many weeks before any other diagnostic sign is apparent, differential diagnosis, therefore must be made early in the course of the disease. When the full blown symptoms of brain tumor have developed it is often too late to effect a cure even by complete removal. Given the single symptom of headache, a good neurologist or neurosurgeon will be able to diagnose and localize a brain tumor if one exists. One must not wait for choked discs, projectile vomiting, paralysis, blindness and mental deterioration before making the diagnosis.

Unfortunately the neurosurgeon still encounters brain tumor in a very late stage. A great majority of the patients have suffered from headache for many months, some are brought to the neurosurgeon in coma approaching death, and at a time when the patient is in such a sad state of metabolic bankruptcy that operation cannot be successfully performed. There is always a stage in every case of brain tumor when the patient can be examined by craniotomy without appreciable risk of operative death. The present high mortality rate is due largely to the fact that operation is performed as a last resort.

All that has been said about brain tumor applies, to some extent to the intracranial blood clot, particularly subdural hematoma. Headache is usually the earliest—and many times the only—symptom of this disorder. It is persistent and gradually increases in severity. Sooner or later the patient becomes somnolent, stuporous and comatose. The diagnosis can be made during the headache stage and without any other symptoms. These large intracranial clots are caused by injury, but the injury may be so trivial as not to cause a fracture of the skull, indeed, it may not attract any unusual attention on the part of the patient. The clot can be removed by neurosurgical methods with local anesthesia and without any great risk to the patient. In fact, the operation often requires only a tiny trephine opening, no larger than a dime, after which the patient recovers dramatically and completely. This is a fairly common disorder, but far too many people still die from it without benefit of surgical intervention.

Another type of intracranial hemorrhage commonly known as spontaneous subarachnoid hemorrhage, is now known to be due to rupture of an aneurysm on one of the cerebral vessels. This disorder occurs most commonly in young persons. It is not necessarily due to arteriosclerosis but apparently is a congenital malformation. In most cases it occurs prior to adolescence. This type of hemorrhage occurs at the base of the brain, extending out into the cerebrospinal fluid bearing spaces. It is easily discovered by a spinal puncture, since blood is mixed with the spinal fluid. It is characterized by a sudden violent onset, associated with vomiting if the headache is severe enough. Stiffness of the neck, slight fever, and rigidity of the legs and arms follow, with a great deal of constant headache over the entire cranium and reaching down the back of the neck. If the ruptured aneurysm is in the neighborhood of one of the large cranial nerves, there will be associated signs of paralysis of this nerve. Since the lesion commonly occurs on the first portion of the internal carotid artery as it enters the cranial cavity, there is often associated paralysis of the third nerve, as indicated by ptosis of the upper lid paralysis of the external ocular eye muscles causing the eyeballs to turn outward, and dilatation of the pupil on the side of the hemorrhage. This is caused by rupture of the aneurysm directly into the oculomotor nerve. If the aneurysm is in a location where it presses tightly against one of the large sensory roots, such as the orbital branch of the fifth cranial nerve, there is very severe, sharp pain in the area of distribution of this nerve in the orbit and in the supra orbital area. A telltale bloody spinal fluid confirms the diagnosis. The next step is an attempt to save the patient from secondary hemorrhage, which may occur at any time from a few days to three weeks after the first one. In fact, even though this period passes without subsequent hemorrhage, a second one is very likely to occur some months or years later, the mortality, therefore, eventually reaches a virtual 100 per cent.

The clinical diagnosis of spontane

subarachnoid hemorrhage caused by ruptured aneurysm can be made quite accurately. The exact location of the aneurysm can be determined by arteriographic study of the cerebral vessels. This is accomplished by injecting the internal carotid or the vertebral artery, whichever may seem to be supplying the general area of the lesion, with thorotrast. Cure of the aneurysm then must depend on its exposure by craniotomy and by ligation (with a silver clip) of the neck of the aneurysm as it comes off the vessel to which it is attached. Sometimes this vessel itself can be ligated on either side of the neck of the aneurysm; in some instances it is better to ligate the internal carotid artery in the neck. Generally speaking, however, these lesions can be localized, exposed, isolated and directly ligated, so that a permanent cure will result. Strange as it may seem, the operative mortality is not great, being less than 20 per cent in my own series of cases.

The problem of intracranial aneurysm is the newest challenge to the neurosurgical profession. Its importance is indicated by recent investigations, which disclose the fact that these lesions are found to account for almost 10 per cent of sudden deaths among young persons.

Brain abscess causes headache of a rather violent type. It is usually accompanied by low-grade fever and signs of meningitis. However, this is not always the case. Many times, to be sure, there is an acute or subacute sinus infection, or a middle ear disease with involvement of the mastoid. But again, in many instances, there are no sudden toxic symptoms. Apparently the abscess often forms from a bacterial embolus, lodging in the brain, which has been dislocated from some infective focus in a distant part of the body. Indeed, often a brain abscess is confused with a brain tumor. [illegible] symptoms may be identical. Frequently [illegible] diagnosis is not made until the lesion is [illegible] operation. When headache starts [illegible] and increases in severity over a [illegible] period—a week or ten days [illegible] occur, one should [illegible] the size of such a lesion [illegible] suddenly brings about all [illegible] intracranial pressure [illegible] rather violent. [illegible] after one [illegible] into thinking that the abscess is necessarily in close approximation to the obviously infected ear or nasal sinus. Such a lesion may be the focus of infection, but the abscess itself may be on the opposite side of the skull cavity. Unless there are definite localizing signs of the abscess, it is well to locate it ventriculograpically. Brain abscess nowadays is one of the most easily curable diseases of the cranial cavity. Usually it is a solitary, circumscribed collection of pus and one has only to localize it accurately and place a drainage tube through a tiny trephine opening into the middle of the abscess. The pus drains out, and the abscess is completely closed within a week or ten days with the aid of modern antibiotic drugs. These drugs have so greatly reduced the incidence of abscess of the brain so that it has become relatively uncommon. When it does occur, the outlook for recovery is much better than in the past.

A discussion of chronic headache would not be complete without mention of *headache caused by hypertensive disease.* Persons with high blood pressure frequently suffer from a throbbing headache not localized to any single portion of the cranium. When the blood pressure goes down the headache usually subsides. There is no known mechanism for the initiation of this type of headache. Apparently it is due to increased intracranial pressure, which in turn is due to a great increase of arterial pressure in the cranial cavity. It is common knowledge that anything that causes intracranial pressure may produce a generalized headache. There is no treatment for this condition except to try to reduce the hypertension. One should be cautious, however, not to confuse the headache of hypertensive disease with migraine occurring in a hypertensive person.

SUMMARY

Some of the more common types of chronic headache are discussed, all of which must be well understood and approached from the point of view of common sense. The various types of headache fit into two large categories: (1) migraine and related atypical head pains and (2) headaches caused by specific clinical entities, for which specific treatments are available. For migraine it is important to use effective symptomatic treatment. The mental

state of the patient requires close attention, as he often suffers more from anxiety and mental distress than from actual physical discomfort. The treatment for headache caused by specific disorders, however, is entirely different. Here one must apply the most exacting diagnostic and therapeutic procedures. These are largely concerned with neurosurgical diagnosis and mechanical methods. With headaches in this category time is an extremely important factor, and only the least possible amount of it must be allowed to elapse between the onset of symptoms and the application of specific surgical therapy.

SOMMAIRE

L'auteur discute des maux de téte chroniques, qui doivent être compris et traites intelligemment Les différents types de maux de tête peuvent être classés en deux catégories:

1)—Migraines et maux de tête typiques apparentés.

2)—Maux de tête causés par les traitement médicaux et spécifiques.

Pour les migraines, il importe d'avoir recours à un traitement symtomatique efficace. L'état mental du malade demande une étude approfondie car ces malades souffrent plus de détresse mentale que de troubles physiques. Le traitement des maux de tête déterminés par des causes spécifiques est entièrement différent.' Ici, il faut employer le diagnostic et les procédès thérapeutiques les plus précis.

Ce traitement demande un diagnostic neurochirurgical et des méthodes graphiques. Avec les maux de tête de cette catégorie, le temps est un facteur d'une extreme importance et il est désirable que le moins de temps s'écoule entre l'apparition des symptômes et l'application d'un traitement chirurgicale spécifique.

RIASSUNTO

Discute alcune delle piu' comuni forme di cefalea. Queste possono essere raggruppate in due larghe categorie: (1) emicranie e cefalee atipiche, simili a queste; (2) cefalee dovute a cause specificne.

In quanto alle emicranie, l'A. ritiene essenziales un adeguato tratamento sintomatico. Le condizioni mentali richiendono un controllo prolungato, minuzioso, in quanto i pazienti soffrono in realta' piu' di ansie e di preoccupazioni psichiche che di sofferenze fisiche.

Le cefalce dovute a cause specifiche vanno invece sottoposte a rapide indagini diagnostiche e misure terapeutiche. Il tempo assume infatti-in questi casi-un'importanza fondamentale: un intervallo quanto piu' breve possibile deve decorrere dall'inizio del sintomi all'intervento chirurgico.

For summary in
Spanish, see Page 123

Obstetrical Emergencies

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PRE-ECLAMPSIA and Eclampsia: The cause of these toxemias of pregnancy is unknown, although many theories have been advanced and much research work is still being done on the problem.

Hypertension that develops early in pregnancy, or late in pregnancy with no associated gain in weight, no edema, and normal urine is usually classified as essential hypertension.[1]

The recurrence of toxemias in future pregnancies varies from 25 to 50 per cent. The longer the patient has had the hypertension, the greater the recurrence of toxemia and even nephritis. The older the patient is, the more likely it is that residual damage to the kidneys is present. Residual postpartum hypertension (blood pressure over 140 systolic and 90 diastolic) more commonly follows pre-eclampsia than eclampsia.[2]

Patients with severe pre-eclamptic and eclamptic symptoms should be advised to wait at least two or three years, and to have their blood pressure and renal function checked, before they become pregnant again. They should be watched more carefully in succeeding pregnancies. The more common renal function tests used are the urea clearance, the urine concentration test, and fifteen-minute phenosulphothalein tests.[3]

Chronic nephritis and essential hypertension are generally diagnosed in an early stage of prenatal care, whereas the toxemias of pregnancy develop usually in the last trimester. The best prophylaxis against these toxemias is good prenatal care, with careful attention to gain in weight, blood pressure, edema, and urine. Microscopic examination of the urine is necessary; albumen appearing therein before the twentieth week of pregnancy indicates a bad prognosis for the fetus. The signs and symptoms of pre-eclampsia [illegible] hypertension, blood pressure 140/90 or [illegible] excessive gain in weight, edema of [illegible] headache, albuminuria with or [illegible] disturbances and epigastric pain. [illegible] output is usually decreased; [illegible] due to arteriolar spasm decreasing the blood flow to the kidneys. The treatment is bed rest, preferably in the hospital, a salt-free, high protein diet, mild sedatives, such as phenobarbital; careful check of the fluid intake and urinary output (the twelve-hour output should be recorded from 7 a.m. to 7 p.m. and the twenty-four-hour output from 7 a.m. to 7 a.m.), Ammonium chloride may be given, since it offers hope of freeing the sodium ion, but it should not be given for more than one week, lest acidosis occur as a result. A laxative, such as magnesium sulphate, may be given but should not be continued if the patient has hemorrhoids. The patient should be weighed daily, and a daily urinalysis should be done. The fetal heart tones should be checked at regular intervals; if any abnormality, such as a rate over 160 or under 115 is observed, it may be a sign of fetal distress. This condition of the fetus may be treated empirically by intravenous administration of 500 cc. of 10 to 20 per cent dextrose in water. If the pre-eclampsia does not improve, or becomes progressively worse, after five to seven days of hospital treatment the child should be delivered. A sterile vaginal examination will determine whether the cervix is ready, and, although it may be long, firm and closed, it will sometimes soften up after one or two medical treatments with castor oil, quinine and enemas. If the cervix is sufficiently dilated, the membranes may be ruptured and delivery accomplished from below. Premature babies should be delivered by episiotomy, to protect the fetal head. The anesthetic should be either local or low spinal. Should the cervix remain firm, a low cervical cesarean section should be done with either local or low spinal anesthesia.

Eclampsia is an advanced stage of pre-eclampsia and is associated with convulsions and coma. Pre-eclampsia is a mild pathologic condition, but eclampsia is a serious disease. Maternal mortality in the United States ranges from 10 to 15 per cent. This high mortality rate is undoubtedly due to radical treatment, such as accouchment force and cesarean section before the convulsions are controlled In well conducted hospitals where conservative treatment is the usual procedure the maternal mortality ranges from 5 to 8 per cent If the critically ill patient has anuria and is not improving, we have tried to relax the vasospasms with First, parasympathetic block with procaine, second, high spinal anesthesia, third, 1,000 cc of 0 1 per cent intravenous procaine solution in 5 per cent dextrose in water, and fourth, etamon, hoping that it will relax the arterial vasospasms and increase the blood supply to the kidneys

When the patient has convulsions, she should be put into a dark and quiet room with constant attendance Continuous oxygen should be given for cyanosis, which is usually present, and the patient should be protected from injury by tongue depressors between the teeth and side boards on the bed to prevent falling Delivery should not be contemplated until the convulsions are controlled The patient should be sedated with morphine, especially if the respirations are rapid, and small doses of barbital, preferably phenobarbital, given intramuscularly A retention catheter is inserted so that a careful check of the urinary output can be maintained In my opinion, no drugs should be given that lower the blood pressure, such as veratrium viride (veratrone), as the rise in blood pressure is a physiologic response to force out toxins through the damaged kidneys[4] It is known that if the blood pressure is lowered there is an undesirable suppression of urinary output[5] The prognosis of eclampsia becomes worse with rising temperature and pulse rate, increased respiration and uncontrolled convulsions Five hundred cc of 10 to 20 per cent dextrose in water is given intravenously and repeated at eight hour intervals Venesection is contraindicated, because most eclamptic patients have secondary anemia and may lose a large amount of blood with the delivery Twenty cc of 10 per cent magnesium sulphate may be added to the dextrose, but too large a dose of this drug may cause respiratory embarrassment Death is generally due to overwhelming toxemia and pulmonary edema

After the convulsions are controlled, if labor has not begun spontaneously, medical induction may be tried Bags and bougies are contraindicated, but rupture of the membranes is a very good procedure Should the cervix be long, hard and closed, a low cervical cesarean section should be done with the patient under local or low spinal anesthesia, if a good anesthetist is available[6]

Placenta Praevia Maternal mortality from hemorrhage has not been decreased as much as mortality due to other causes Placenta praevia carries a high maternal mortality and a still higher fetal mortality The incidence of placenta praevia, in a large series of cases, is about 0 8 per cent and accounts for 15 to 20 per cent of maternal deaths

The diagnosis of placenta praevia is based on painless, causeless bleeding in the last trimester The head is often not engaged, and the fetal heart tones are generally normal in rate and rhythm In diagnosis, the condition should be differentiated from abruptio placentae, lesions of the cervix (such as erosions and carcinoma), varicosities of the vulva and the vagina, and hemorrhoids If the patient is seen at home, she should not be subjected to a vaginal examination or a vaginal pack Rectal examination is always contraindicated She should be transported to the hospital in an ambulance, the blood should be typed immediately and the Rh factor determined If no blood bank is available, at least two cross match donors should be held in readiness If possible, roentgen examination should be made or air cystograms taken, the lateral views being more important than the anterior posterior views Besides helping with the diagnosis, the roentgen ray may reveal a deformed fetus The incidence of monsters is high in cases of placento praevia, about 4 per cent, which is three or four times the percentage of fetal abnormalities in normal deliveries

If a diagnosis of placenta praevia is made by roentgen study, vaginal examination should be deferred or omitted A sterile pelvic examination should be done in the hospital, where the delivery room should be set up for delivery and the operating room in readiness for an emergency cesarean section[8] Vaginal packing is contraindicated, because it may mask the symptoms of bleeding and cause further separation of the placenta with more marked internal bleeding On pelvic examination the cervix is usually found to be soft and culent, owing to a marked increase in vascularity of the lower uterine segment. The cervix is usually dilated 2 or 3 cm., and the placenta can be felt by manual examination.

If the bleeding is not severe and is not increased by pelvic examination, and if the fetus is small, watchful expectancy may be tried.[9] The patient must remain in the hospital under observation, if it is deemed advisable to wait for the fetus to increase in size.

Marginal and lateral placenta praevia with slight bleeding and some softening and dilatation of the cervix may be treated by rupturing the membrane and applying gentle traction on the fetal scalp with a Willett or a vulsellum forceps.

If the patient has a central placenta praevia, regardless of the size of the fetus or whether it is a monster, she should be delivered by cesarean section, as this is primarily a maternal indication and secondarily a fetal indication.

Pituitrin and other oxytocic drugs are contraindicated in cases of placenta praevia, because of the deep tears in the cervix and the lower uterine segment that may result from their use.

Vaginal cesarean section is contraindicated because of profuse bleeding from the varicosities in the lower uterine segment. If the fetus is delivered from below, the third stage should be watched very carefully, and if a severe hemorrhage follows, the placenta should be removed manually and the cervix and lower segment carefully inspected with wide retractors and sponge forceps before the uterus is packed.

If cesarean section is performed, the low cervical type is advocated, because the placental site is in the field of operation and the [illegible] sinuses can be sutured or the uterus [illegible] with the bottom end of the pack pushed [illegible] the cervix into the vagina. It is good [illegible] start the cesarean section with a [illegible] giving additional blood [illegible] spinal anesthesia. [illegible] anesthesia of choice. [illegible] may be ad- [illegible] infec- [illegible] is observed [illegible]

cularity of the lower uterine segment and the bladder. Bags and versions are also contraindicated.

The prognosis of placenta praevia is improved by giving transfusions to replace more blood than is lost.

Premature Separation of the Placenta: Abruptio placentae is premature separation of a normally implanted placenta, generally occurring during the last trimester of pregnancy.

A good prophylactic measure is to get the blood type and Rh determination at the time blood is drawn for an antepartum Wassermann test.

The cause of this accident is not known, but toxemia and occasional trauma may be associated with the condition.

The diagnosis is usually made from a history of severe abdominal pains, external vaginal bleeding, or signs of hemorrhage, such as rapid pulse, a blood count showing anemia and leukocytosis, pallor, and dyspnea. The symptoms and seriousness of the condition depend upon the amount of separation of the placenta and the extent of loss of blood. In many cases retroplacental clots are the sole means of diagnosis. The fetal heart tones may become irregular and fast, and if they disappear the baby has died. The uterus usually feels firm, boardlike and tender. In most cases bleeding eventually appears, associated with a fall in blood pressure, even in cases of toxemia. Evidence of shock appears early and is out of proportion to the amount of blood lost. The hemorrhage may be concealed by the presenting part of the fetus or by membranes blocking the cervix. The patient should be given morphine for the pain and shock and hospitalized as soon as the diagnosis is suspected.[10]

There are two accepted forms of treatment: first, conservative, with delivery from below. This method seems to be the one of choice at present. If delivery is contemplated from below, the membranes should be ruptured, enabling the uterus to contract more efficiently. This will also demonstrate any internal bleeding. Tight abdominal binders and pituitrin are contraindicated. Pituitrin only stimulates a tired tetanic uterus into further activity, causing more bleeding into the myometrium.

This condition makes the shock more profound The shock should be combated with intravenous dextrose in distilled water and plasma while the patient's blood is being typed and donors cross matched If the uterine contraction has any semblance of rhythm a sterile vaginal examination in the hospital should be done to rule out placenta praevia and to determine the dilatation and softness of the cervix Rupture of the membranes also shortens the labor Labor is usually short owing to the tumultuous pains[11] Intravenous ergotrate should be given at the end of the second stage

Second low cervical cesarean section is sometimes done for the fulminating type with complete separation of the placenta when the cervix is long, firm and closed, whether the baby is dead or not Before the cesarean section is started, the patient should be given a transfusion and another donor held in readiness After the baby is extracted, the patient should be given intravenous ergotrate to see whether it will contract the uterus to normal If a Couvelaire uterus is found, it should be watched for a short time, as the tendency is swinging away from cesarean hysterectomy If the uterus continues to bleed, it can be packed with the bottom end of the pack *pushed through the cervix into the vagina* In suturing the uterus, care should be taken not to incorporate the pack with any of the sutures

All in all, the tendency is toward more conservative treatment of premature separation of the placenta

Ruptured Uterus Fortunately, the condition is comparatively rare The diagnosis is often very difficult to make and in some cases is made only at autopsy Although perforation of the uterus is common as a result of instrumentation early in pregnancy for either therapeutic or criminal abortion, it will not be discussed in this short paper

Traumatic rupture of the uterus is most commonly seen during labor but may occur spontaneously in the last trimester of pregnancy The incidence of this complication increases with multiparity and age, most of the patients have borne three or more children and are over 35 years of age The picture often resembles that seen in cases of ruptured ectopic pregnancy Hemorrhage, which is associated with this condition is very serious owing to the shock caused by blood loss and peritoneal irritation External bleeding may be slight and is seen only in about 10 per cent of the cases[12]

Rupture in an obstructed labor usually occurs in the lower uterine segment, while the spontaneous or "quiet" rupture usually occurs in the body of the uterus Traumatic rupture is twice as common as any other type The maternal death rate is very high, ranging from 35 to 60 percent in a series of cases from large clinics[13] The fetal mortality runs from 80 to 90 percent

The most common causes are version and extraction, scars of previous cesarean sections, especially of the classic type The site of a previous cesarean section scar always shows fibroblasts microscopically,[14] and when a rupture occurs in this site at a later pregnancy it is probably due to an infection or poor approximation of the tissues Other common causes are oxytocic agents, dilatation and curettage, degenerating fibroids, previous placenta attachments associated with placenta and placenta accreta, neglected cephalo pelvic disproportion, abnormal presentations and ill timed forceps deliveries In manual dilatation the cervix is usually torn, and the lesion may extend up into the uterine vessels and the lower uterine segment The latter is more often seen in an elderly primipara with a rigid, unripe cervix, or a scarred cervix from cervical cautery and cervical trachelorraphys Distention from multiple pregnancies and polyhydramnios apparently play no role In reviewing the etiology of the ruptured uterus, it can be seen that in most cases the accident is preventable

Diagnosis is usually made when the patient complains of a sharp tearing pain, which may or may not continue If there is an incomplete rupture and the bleeding is extraperitoneal, between the leaves of the broad ligaments, the pain may be severe, probably because of stretching of the peritoneum The amount of shock may be out of proportion to the amount of blood lost Most of these patients show some blood in the urine, probably appearing as a result of disturbance of the vesical mucosa In nearly all cases of rupture there are signs of concealed hemorrhage and shock Fetal mo [illegible] and no fetal heart tones [illegible]. Patients may have an area of [illegible] abdomen, and if they are in [illegible] contractions generally cease. [illegible] be palpated just under the ab[illegible] and the uterus felt below it. In [illegible] cases, hysterosalpingogra[illegible] the diagnosis.

[illegible] pelvic examination, the [illegible] below the fetus, and some [illegible] found by intrauterine palpation. [illegible] extraction, it is always wise [illegible] uterine cavity for such a compli[illegible]

[illegible] of complete rupture before [illegible] serious for the mother and [illegible] fatal for the fetus. The [illegible] is more favorable if the [illegible] the hospital, where active [illegible] instituted at once. The [illegible] is definitely influenced [illegible] diagnosis and active [illegible] hemorrhage and shock. Post[illegible] a common and serious [illegible]

[illegible] prevention. In a [illegible] accident can be [illegible] of the attendant to [illegible] who have had [illegible] the uterus, such as [illegible] watched very [illegible] cesarean [illegible] the thirty-[illegible] may un[illegible] with [illegible]

[illegible] repaired and an elective cesarean section done with the next pregnancy. A total hysterectomy should never be done in cases of rupture, as it is a formidable operation even with the patient in good condition. Some surgeons advise tubal ligation if the uterus is repaired. Continuous oxygen and low spinal anesthesia is probaly the anesthesia of choice. A uterine pack is sometimes used to help control the bleeding and keep the intestines out of the vagina while the patient is being prepared for a laparotomy. If intravenous plasma and blood are given too soon, it may raise the blood pressure enough to force more blood through the tear into the peritoneal cavity, but the transfusion should be running at the time operation is begun.

Postpartum Hemorrhage: Hemorrhage is still the principal cause of death in pregnancy and accounts for 30 percent of maternal deaths in the United States. For this reason the fourth stage of labor, that is, the hour following delivery of the placenta, is very important.[16] If a patient's blood count is not checked during the later part of her prenatal care, she may come to delivery with severe secondary anemia, in which case a small loss of blood would be a serious complication. The blood loss from delivery averages about 150 cc.; anything over 300 cc. should be considered a hemorrhage. Long, tedious labors with a fluid loss due to dehydration may become very serious as a result of moderate hemorrhage.[17]

The chief cause of postpartum hemorrhage is atony of the uterine musculature, and uterine inertia may continue into the fourth stage of labor. Multiple pregnancies and polyhydramnios may also disturb the normal contractions of the uterine musculature. Preparation for an emergency in these cases should be the usual routine. Retained secundines and/or membranes are probably the second most [illegible] cause of postpartum hemorrhage. [illegible] may not bleed for as late as seven [illegible] days after delivery.[17] Lacerations of the [illegible] are usually diagnosed by finding [illegible] firm [illegible] by a steady, con[illegible] Inspection [illegible] completely [illegible] of bleeding. [illegible]

Patients with postpartum hemorrhage usually show a soft, atonic uterus that becomes large and refills after the clots have been expelled. Blood pressure, pulse, respiration and cold beads of perspiration show the early signs of shock and collapse. The most serious hemorrhages are those that bleed in spurts with large clots. Because the uterus contracts and then relaxes, the attendant usually procrastinates and does not actively treat the hemorrhage.[19] The most conservative treatment is intravenous infusion of ergotrate and 1 cc. of pituitary extract in 500 cc. of dextrose in water. The corpus uteri should be watched from one to two hours after delivery.

If more than 300 cc. of blood is lost before the placenta is delivered, it should be removed manually, care being taken to separate the placenta intact. At the same time, the body of the uterus can be explored for lacerations and/or rupture. If any retained succenturiate lobes and/or membranes are found, they should be removed. If the bladder has not been previously emptied, the patient should be catheterized.

The treatment of hemorrhage is one of prevention. If the patient has had an inhalation anesthesia which tends to slow down the normal physiologic separation of the placenta, she should be given intravenous ergotrate as the head is coming over the perineum. The fetus should be very slowly delivered,[20] which helps the uterus to contract and separate the placenta. The Crede method of massaging the uterus should be condemned. The attendant should frequently palpate the corpus uteri to see when the placenta has separated, but should not massage the uterus. Trying to express the placenta before it is separated can cause extra blood loss. The placenta should be removed manually if it can not be expressed one hour after delivery. If the patient has her blood typed and the Rh factor determined at the time the prenatal Wassermann specimen is drawn, many valuable minutes can be saved in acquiring blood for transfusion. In acute emergencies, type O, Rh-negative blood may be used. The important thing is to save blood by not doing an episiotomy until the fetal head is ready to be delivered over the perineum. The use of forceps before complete dilatation has taken place may tear the cervix and the vagina. The blood lost should be replaced with an equal amount by repeated blood transfusions. Plasma may be started while the blood is being typed and cross-matched. When the placenta is inspected and not found intact, the retained cotyledons should be removed manually. If the hemorrhage is severe, transfusions may be given through any one of five portals: both arms, both ankles, and the sternum. Oxygen should be given continuously to combat the anoxemia to the brain, which may leave permanent damage even though the patient lives.

The lacerations should be repaired and the bleeding points ligated. If the uterus continues to relax, it may be packed with oxidized cellulose gauze, which comes in four-yard uterine packs. If this does not control the bleeding, it may be necessary to pack the uterus with a 5-yard gauze packing. This is done by inserting the hand into the uterus, and with a dressing forceps carefully pushing the gauze up to the tips of the fingers, where they in turn pack the uterus tightly as the hand is slowly withdrawn. After the uterus is firmly packed, the vagina is packed also. This pack should be removed very slowly after twelve hours, with 1 cc. of ergotrate administered before removal. Prophylactic antibiotics and sulfa drugs should be given to combat any infection that may develop.

In rare cases the patient continues to bleed through the uterine pack, and in these instances the shock must be treated by replacing the blood lost and an abdominal hysterectomy performed even in primiparas. This seems a radical procedure, but it may be the only thing that will save the patient's life.[21]

SUMMARY

Pre-eclampsia, eclampsia, placenta praevia, abruptio placentae, uterine rupture and postpartum hemorrhage are discussed in the light of modern knowledge and the author's experience. Technics for dealing with each condition are outlined.

SOMMAIRE

L'auteur discute, en tenant compte des connaissances modernes et de sa propre expérience, la pré-eclampsie l'éclampsie, la placenta praévia, l'abruptio-placentae, la rupture de

[illegible] l'hémorragie postpartum. Il décrit [illegible] employées dans chaque cas.

RIASSUNTO

[illegible] la pre-eclampsia, l'eclampsia, la [illegible] previa, il distacco della placenta [illegible] inserta, la rottura dell'utero e [illegible] post-partum in base ai concetti [illegible] e l'esperienza personale dell'A. P[illegible] rassegna le cure piu' opportune per [illegible] di queste complicazioni.

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Clinicopathologic Study of One Hundred Consecutive Thyroid Procedures

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THIS modest series of thyroid procedures is presented for study for several definite reasons. First, almost all of the patients were treated individually from the beginning of preoperative therapy to the conclusion of postoperative management. Second, certain significant facts were revealed and a new symptom of hyperthyroidism was observed. Third, the use and abuse of antithyroid drugs, plus their value in the eradication of thyroid crisis, were studied. Fourth, elective tracheotomy following certain thyroidectomies was demonstrated to be a valuable surgical asset. Last, the pathologic conditions observed included practically all types of thyroid disease except Riedel's struma. For these reasons it is believed that the series is worthy of critical study.

CLINICAL STUDY

The patient with hyperthyroid disease is different from any other patient encountered by the surgeon. Hyperthyroidism may affect any or all of the organs of the human body, and the disease process is protean in its manifestations. A common symptom infrequently described is phobia.[1] In this series, by careful interrogation, it was possible to confirm the presence of a phobia in almost all patients with severe hyperthyroidism. Special attention is called to this symptom because of its frequent association with hyperthyroid disease and because often the patient is erroneously sent to the department of psychiatry when he should be sent to a thyroid clinic instead.

Among the phobias associated with hyperthyroidism are claustrophobia (fear of confined places), monophobia (fear of being alone), ochlophobia (fear of crowds), acrophobia (fear of high places), anthrophobia (fear of men), gynophobia (fear of women), hematophobia (fear of blood), nyctophobia (fear of the dark), zoophobia (fear of animals), taphephobia (fear of being buried alive), and astraphobia (fear of thunder).

These patients also afforded material for a study of borderline hyperthyroidism.[2] The management of patients with borderline hyperthyroidism demands careful observation by the surgeon, since it is he who assumes the final responsibility of operation. Unless he is alert, he may perform a thyroidectomy only to find that the preoperative symptoms persist or become more marked after the operation. Psychosomatic symptoms have been demonstrated in many patients without thyroid hyperfunction. Psychoneurotic states are notorious for simulating hyperthyroidism. Hospitalization is a valuable aid in the differential study of this type of patient. Functionally disturbed patients improve remarkably when they are placed in a hospital, they are liberated from family entanglements, and mental relief occurs in a few days. Freedom from noxious mental stimuli eliminates the tachycardia and the nervous symptoms.

A third observation in the clinical picture of hyperthyroidism centers about the exacerbation of symptoms during the climacterium.[3] During this period many patients with latent hyperthyroidism suddenly present the classic picture of this disease. Such patients may need thyroidectomy for correction of their distress, others of menopausal age can be managed satisfactorily with adequate medical therapy. A third type of menopausal patient is the woman who has had a thyroidectomy and yet shows a recurrence of hyperthyroid signs and symptoms. Judicious study of this type of patient often obviates the need for operation if the antithyroid drugs are properly employed.

PREOPERATIVE PREPARATION

In years past, the greatest danger to the hyperthyroid patient was thyroid crisis.[4] The advent of the antithyroid drugs has reduced the incidence of crisis to a negligible figure. However, the exact indications for employing the thiourea group of drugs is frequently confused, and this confusion has resulted in

Prior to operation it was necessary to prepare those patients who had cardiac disease. This was done by a competent cardiologist. In addition to cardiac dysfunction, hyperthyroidism is notorious for accelerating tuberculosis and diabetes. In this series 4 patients had tuberculosis with or without pleural effusion. Three others had diabetes mellitus. In 2 instances chronic thrombophlebitis was encountered; both patients had had a bilateral ligation of the saphenous vein prior to thyroidectomy. For patients with neuroses the aid of a psychiatrist was enlisted both before and after operation.

OPERATIVE PROCEDURES

The operation performed was determined by the operative status of the patient and the pathologic condition under consideration. These procedures were performed:

Total thyroidectomy	6 cases
Subtotal thyroidectomy	80 cases
Hemithyroidectomy	13 cases
Excision of cystic thyroid adenoma	2 cases
Excision of thyroglossal cyst and/or sinus	2 cases
Elective tracheotomy	3 cases

Total thyroidectomy was performed in those cases in which carcinoma was known, suspected or confirmed by histologic study. A routine subtotal procedure was employed in 80 cases for either primary hyperthyroidism or adenomatous colloid goiter with or without hyperthyroidism. Hemithyroidectomy was performed 13 times. Two patients underwent two-stage operations (hemithyroidectomy, first right and later left) for severe hyperthyroidism. Five patients underwent hemithyroidectomy for adenoma; 4 others underwent the same procedure for fetal adenoma.

In 2 cases simple excision of a benign adenoma was performed. Both adenomas were cystic in appearance, without macroscopic evidence of malignancy. Hemithyroidectomy was performed in the other cases of adenoma because of the high incidence (about 7 per cent) of carcinomatous change in adenoma.

Two patients were treated who had thyroglossal cysts and sinuses They were operated on without any preoperative medication

An operative procedure worthy of emphasis is elective tracheotomy. Tracheotomy was performed on 3 patients at the time of the operation. An elective tracheotomy is to be advocated for patients with large colloid goiters producing tracheal compression and/or marked tracheal deviation. This applies especially when there is substernal extension of the gland.[6] In the 3 cases in which this treatment was employed, a satisfactory outcome would have been questionable without an elective tracheotomy.

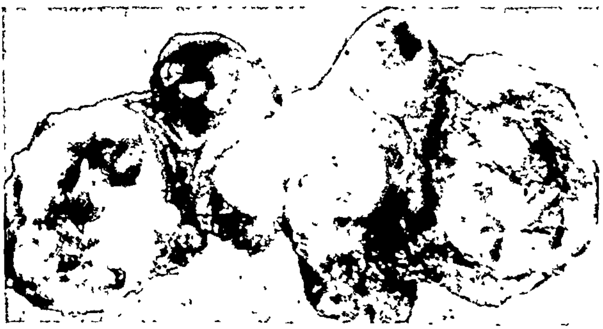

Fig. 3 Operative specimen removed from patient, showing tracheotomy tube. The diagnosis was adenomatous colloid goiter.

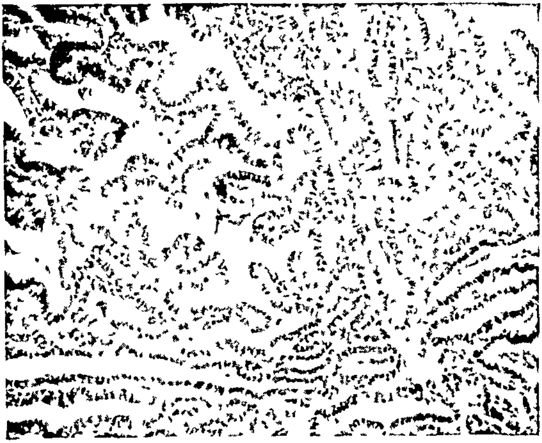

Fig 4 Microscopic section showing papillary adenocarcinoma of the thyroid gland

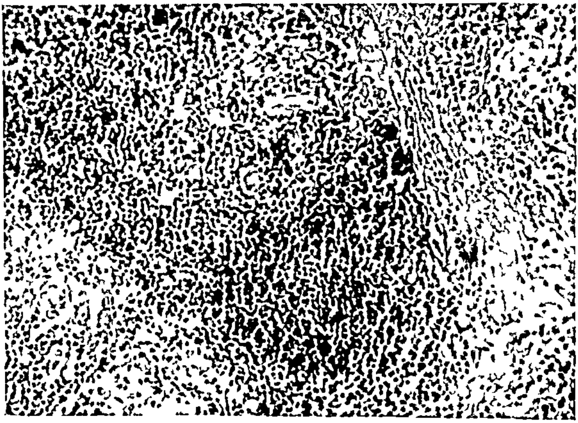

Fig 5 Microscopic section (x 170) of thyroid gland, showing lymphocytic infiltration and giant cells in a case of struma lymphomatosa (Hashimoto's disease)

PATHOLOGIC PICTURE

Histologic study of the 100 operative specimens demonstrated almost all the types of thyroid disease except Riedel's struma. The final pathologic diagnoses fell into the following groups:

Primary hyperthyroidism (toxic goiter)	60 cases
Adenomatous colloid goiter with secondary hyperthyroidism	15 cases
Adenomatous colloid goiter	5 cases
Fetal adenoma	4 cases
Simple adenoma	5 cases
Adenocarcinoma	6 cases
Hashimoto's disease (struma lymphomatosa)	3 cases
Thyroglossal cyst and sinus	2 cases

Seventy-five per cent of the patients in this series had hyperthyroidism. Sixty of these were classified as showing primary hyperthyroidism; in the remaining 15 cases the final diagnosis was adenomatous colloid goiter with secondary hyperthyroidism. Five patients had adenomatous goiter without hyperthyroidism. This group of 80 patients presented no unusual pathologic conditions.

Fetal adenoma was diagnosed in 4 instances. This type of adenoma is composed of small solid vesicles in which no lumen and no colloid are observed. Fetal adenomas are compactly arranged and frequently develop into malignant adenomas.

Thyroid adenomas in 7 per cent of cases progress to malignancy. In this series nonmalignant adenomas were seen in 5 patients. Adenocarcinoma was encountered 6 times.

This series is too small to be of value in accurate determination of the frequency of malignant thyroid disease. Adenocarcinoma is an insidious invader of blood vessels. This invasion may produce metastases from a small nodule and may necessitate a radical dissection of the neck, including the sternocleidomastoid muscle and the internal jugular vein.

The rapid invasion of adenocarcinoma may bring into view metastatic nodules along the anterior border of the sternocleidomastoid muscle. These nodules were previously thought to be lateral aberrant thyroid tissue. It was believed that, in the course of embryonic development, any thyroid tissue that persisted outside the thyroid proper was aberrant thyroid tissue.[7] This aberrant tissue was believed to undergo malignant changes. More recent knowledge has clarified this problem. It is now believed that what was formerly designated as aberrant thyroid tissue is actually metastatic thyroid carcinoma. Patients with this condition should be treated by radical operation and irradiation.

An unusual pathologic entity in the thyroid gland is struma lymphomatosa, or Hashimoto's disease. This condition was encountered 3 times in 100 operative cases. The gland of struma lymphomatosa on palpation has a diffuse, pebbly sensation. It feels as hard as the thyroid gland of primary hyperthyroidism with iodine involution. The superior poles are extremely broad, being broader than the poles of the gland in cases of primary hyperthyroidism.[8] The pyramidal lobe may be enlarged in a manner similar to the enlargement of the lobe in patients with primary hyperthyroidism.

Micropathologic study of this disease reveals a dense, diffuse lymphoid infiltration between the follicles, with occasional formation of secondary nodules. Sometimes these follicles are extremely prominent, so that the microscopic picture may closely resemble a lymph node; hence the term struma lymphomatosa, or, as it is sometimes called, lymphomatoid goiter. There tends to be a variation in the intensity of lymphocytic infiltration, ranging from occasional scattered lymphocytes among colloid-containing follicles (or even absence of infiltration in certain areas) to complete displacement of the normal thyroid, with confluent masses of lymphocytes forming secondary nodules.

Two patients with thyroglossal cyst and sinus were operated upon. Both were adults with a history of drainage in childhood followed by intermittent healing and reopening. In both cases the sinus opening was found in the midline between the thyroid isthmus and the hyoid bone. The sinus could be palpated longitudinally and suggested a cord extending from the external opening to the level of the hyoid bone.

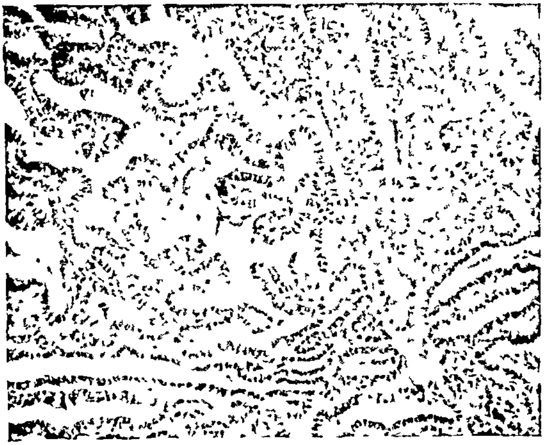

Fig 4 Microscopic section showing papillary adenocarcinoma of the thyroid gland

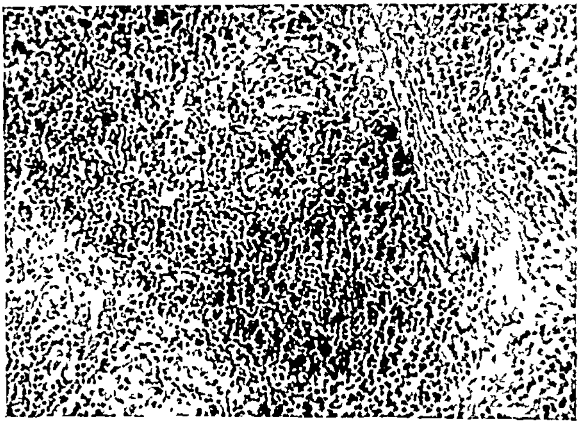

Fig 5 Microscopic section (x 170) of thyroid gland, showing lymphocytic infiltration and giant cells in a case of struma lymphomatosa (Hashimoto's disease)

END RESULTS

In May 1946 the first patient in this series was operated on. To the time of writing all have been followed up by personal call, telephone or letter. The postoperative follow-up therefore is accurate. The hospital statistics show that among these 100 patients there was no mortality, no morbidity and no wound infection.

Patients with carcinoma were treated by radical thyroidectomy plus irradiation. In 1 instance radioactive iodine was administered in addition to operation and irradiation. Marked myxedema developed, and the patient was given thyroid extract. At present she takes 3 gr. of thyroid extract daily and is quite well.

For the patients with adenoma a permanent cure is anticipated as a result of the operation. Of the 3 patients with struma lymphomatosa, 1 had postoperative myxedema and is receiving 1 gr. of thyroid extract daily.

Patients with toxic thyroid disease remain the most interesting of all those studied. Many of them had minor phobias, which lends credence to the dictum "Once a hyperthyroid patient always a hyperthyroid patient." In many cases the preoperative toxic symptoms persist after operation. Psychologically, improvement is almost always noted during the postoperative period. As a generality it may be stated that the mental symptoms persist after the operation for a period approximately equal to their preoperative duration.

No recurrences have occurred in the patients with thyroglossal sinuses. This may be attributed to complete dissection and removal of the entire sinus tract. Dissection was continued down to the hyoid bone, with excision of a segment of the bone.

SUMMARY

1. A critical study of 100 consecutive thyroid procedures is presented.
2. In this series there were no deaths, no morbidity and no wound infections.
3. The pathologic conditions encountered included almost all histologic types of thyroid disease except Riedel's struma.
4. Attention is called to the frequency of phobia as a symptom of hyperthyroidism.
5. Mention is made of borderline hyperthyroidism and the exacerbation of thyroid hyperfunction during the climacterium.
6. The value of the antithyroid drugs is discussed.
7. Elective tracheotomy as a valuable postoperative asset is mentioned.
8. This survey substantiates the present-day concept that the surgical management of thyroid disease has practically no mortality or morbidity associated with it. This great improvement can be attributed in a great measure to the antithyroid drugs, which have been a most valuable aid in the eradication of thyroid crisis.

SOMMAIRE

L'auteur nous presente une étude critique de 100 opérations consécutives sur la glande thyroide. Dans cette série, il n'y eut aucun décès, aucune morbidité et aucune infection de plaie. Les conditions pathologiques rencontrées compienaient tous les types histologiques des maladies de la glande thyroide, excepté le struma de Riedel. L'auteur attire l'attention sur la fréquence de la phobie comme symptome d'hyperthyroïdisme. Il mentionne les cas proches de l'hyperthyroïdisme et l'exacerbation de l'hyperfonction thyróide durant le climacterium. Il discute la valeur des médicaments antithyroïde. Il mentionne la trachéoctomie élective comme une indication postopératoire. Cette étude confirme les conceptions de nos jours que le traitement chirurgical de la maladie thyroïde n'a en réalité aucune morbidité, presque pas de mortalité. Les grandes améliorations peuvent être attribuées en grande partie à l'emploi de médicaments antithyroïde, qui sont de grand secours pour éliminer la crise thyroïde.

RIASSUNTO

Presenta una serie di 100 operazioni consecutive sulla tiroide, senza mortalita', ed infezioni della ferita. La patologia comprende quasi ogni varieta' istologica, ad eccezione dello struma di Riedel. Richiama l'attenzione sopra la frequenza di fobie quale sintomo di ipertiroidismo. Menziona le disfunzioni della ghiandola che rasentano il limite dell'ipertiroidismo: sottolinea la frequenza di esacerbazioni dell'ipertiroidismo in menopausa. Discute il valore delle sostanze antitiroidee. Propane la

tracheotomia quale misura preliminare in talune operazioni sulla tiroide La casistica riportata dall'A conferma la conclusione che la chirurgia delle malattie tiroidee non ha praticamente piu' alcuna mortalita o morbilita' Il notevole miglioramento dei risultati e' dovuto in gran parte all'impiego giudizioso delle sostanze antitiroidee, estremamente utili nell'eliminazione dell crisi tiroidee

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Determination of the Anesthetic Procedure of Choice

RUTH WEYL, M.D.
CHICAGO

THE mechanism by which anesthetics act is poorly understood, and there is no generally accepted theory to explain the reversible inhibition of excitability and conductivity brought about by the anesthetic agent.

There are a few outstanding experiments, however, which seem to prove that some anesthetics at least lower the oxygen consumption of the brain. Quastel proved it in vitro, using chloretone on brain slices; and Schmidt and his co-workers showed in vivo that pharmacologic doses of pentothal, the anesthetic agent we use every day, lowered the oxygen consumption in the brains of monkeys. Thus there is a possibility that interference with oxidative processes is part of any narcosis and that in anesthetic procedures we deal with histotoxic anoxia.

On the other hand, it has been made clear beyond doubt that an adequate and continuous supply of oxygen is prerequisite to the functioning of the brain and the heart. No storage is possible. Reflexes are abolished if anoxia exists for a few seconds. Six to eight seconds of interruption of oxygen supply causes coma; irreparable brain damage and death of the neurons occur after three to five minutes. The myocardium is nearly as sensitive as the brain. The oxygen demand of the heart under stress is as great as the oxygen demand of the entire remainder of the body, and even under normal conditions the heart requires five times the oxygen needed by an ordinary skeletal muscle.[1] Thus anoxia even of short duration may be deleterious to a healthy heart; in the presence of coronary insufficiency, even mild degrees of anoxemia may cause heart failure and death.

Thus it is obvious that our main concern in anesthetizing any patient is to provide adequate oxygenation throughout the operative procedure and after it, and that the first question in choosing an anesthetic procedure is: Will it provide adequate oxygenation? The next question is: Will the procedure prevent carbon-dioxide accumulation? We are very conscious today of the damage caused by excess carbon dioxide, and we go to great lengths to prevent it by using open drop and insufflation technics in general anesthesia, or the so-called carbon dioxide absorption technic in which chemical absorption of the exhaled carbon dioxide through "soda lime" is accomplished, continuously watching the effectiveness of the absorber, and having several means of doing so besides watching the condition of the patient. In cases of shallow breathing or even of normal breathing in a small child with a small tidal volume, if we use the absorption technic, we assist breathing with each inspiration by slight pressure on the breathing bag to assure good aeration. With the absorption technic the carbon dioxide in the inspired mixture can be kept as low as 0.1 per cent (as compared with 0.03 per cent in the air). To keep dead space and resistance to breathing at a minimum is a matter of necessity in all forms of inhalation anesthesia.

To help maintain a normal transport system, to keep the patient in as nearly normal a state as possible, and to prevent changes in pulse and blood pressure, at the same time giving the surgeon good working conditions and keeping the patient free from pain—this is what we expect from a good anesthetic procedure. Proficiency in the method chosen is one of the most important factors; any method is safe only as the anesthetist is competent in administering it. For example:

A prolonged stage of excitement even in a well chosen method may cause muscular exertion and thus impose a strain on the heart; increased secretions may occur to interfere with adequate exchange in the alveoli and may cause laryngospasm and obstruction; vomiting may occur and lead to aspiration, even death.

Too heavy premedication with an opiate or too deep a plane of anesthesia may be the cause of respiratory depression; shallow res-

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pirations lead to inadequate tidal exchange, hypoxia and circulatory collapse

Failure to insert an airway when relaxation of the jaw occurs may cause obstruction, oxygen want and respiratory arrest On the other hand, too early insertion of an airway or premature starting of the operation may cause laryngospasm with the same consequences

Spinal anesthesia may be a perfect choice for a given case, but if allowed to go to a higher level than necessary the consequences may be disastrous

Local or block anesthesia, the method of choice in many cases, especially if the patient has eaten previously or if vomiting may be expected (as in uremic states or intestinal obstruction) may lead to disaster if not administered with care Inadvertent injection of the anesthetic agent into the blood stream, or too large an amount of the anesthetic drug, may cause convulsions or sudden cardiac collapse Or, if the effect of the local or block anesthetic is not perfect, the patient may suffer immensely from the unrelieved pain Thus it is sometimes better to choose a method with which the anesthetist is thoroughly familiar than to choose one that may be ideally suited for the case, but cannot be administered expertly

I should like to point out briefly the dangers inherent in the different drugs and methods, and their main advantages

A *General Anesthesia*

Cyclopropane may cause arrythmias Ventricular tachycardia, if allowed to persist, may be followed by ventricular fibrillation, if it is recognized in time and the anesthetic agent discontinued, no lasting ill effect will occur Being a parasympathomimetic agent, cyclopropane enhances laryngeal reflexes and contracts the bronchi, thus laryngospasm may be precipitated, and bronchospasm and bronchorrhoe may occur But it has the advantage of providing fast induction, quiet breathing, high oxygenation, and little interference with metabolic processes

Ether, on the other hand, is associated with slow induction, slow recovery, metabolic acidosis and hyperglycemia, as well as nausea and vomiting in the postoperative period and prostration But it dilates the coronary arteries, does not cause appreciable arrythmia or decrease cardiac output, contracts the spleen, dilates the bronchi, and thus, being a sympathomimetic agent, serves excellently to counteract the ill effects of the parasympathomimetic actions of cyclopropane

Ethylene and nitrous oxide are weak anesthetic agents whose main danger lies in the temptation to supply too little oxygen to the patient in using them, since with proper oxygenation only first plane third stage anesthesia can be achieved Like ether, they are respiratory stimulants, but they provide pleasant induction and have no important after effects All these inhalation anesthetic agents are inhaled and exhaled unchanged

Pentothal sodium, the main agent for intravenous anesthesia, has to be destroyed in the body It is a parasympathetic agent, enhancing laryngeal reflexes It may cause bronchospasm and even induce an asthmatic attack in a susceptible patient It may cause respiratory depression and thus respiratory acidosis Fall in blood pressure may be observed But the induction is fast and pleasant, and there is little postoperative nausea and vomiting It is excellent for convulsive states

Avertin (used rectally to produce basal anesthesia) may cause an excessive fall in blood pressure and decreased respiratory exchange even if given in adequate dosage It is better tolerated by children than by adults, but the duration of anesthesia is difficult to control With the patient in the face down position, an endotracheal airway is mandatory It is contraindicated for diseases of the liver and the kidneys, because it is eliminated by conjugation with glycuronic acid in the liver and excreted through the kidneys Its advantages are that it decreases intracranial pressure, is excellent in convulsive states and induces sleep quickly and peacefully

B *Spinal Anesthesia*

A fall in blood pressure may occur, which one may anticipate and try to counteract by administering a vasopressor drug before injecting the anesthetic agent into the subarachnoid space This fall in blood pressure is due chiefly to the blocking of the sympathetic control in the anesthetized area Therefore, the more spinal roots are anesthetized the more arteriolar and capillary dilation is to be expected, with subsequent stagnation and diminished venous return. Moreover, with very high spinal anesthesia intercostal paralysis will occur, causing decreased pulmonary ventilation and hypoxia. Changes in position precipitate hypotension; they should be made very slowly and 100 per cent oxygen should be given to every patient with high spinal anesthesia. Excellent relaxation and a conscious patient who is in complete control of the laryngeal reflexes, e.g., during a gastric resection or in any state in which regurgitation is anticipated, are the advantages. In continuous spinal analgesia when a malleable needle or a suitable catheter for repeated injection is left in the spinal canal, analgesia of many hours duration can be provided, induced so gradually that little change in blood pressure occurs.

To those familiar with the advantages and disadvantages of the different drugs, it seems logical to combine several agents and methods: for instance, a fast induction with cyclopropane may be the choice in a given case. After the surgical stage of anesthesia has been reached, small amounts of ether are added to the inhaled mixture to stabilize the cardiac rhythm and to stimulate respirations. If much relaxation is needed, curare may be injected intravenously instead of subjecting the patient to a deep plane of anesthesia which would provide adequate relaxation but might lead to shock if maintained for a long time. Thus, we can insure excellent oxygenation, a light plane of anesthesia and good relaxation. Another example: pentothal sodium is always used by us, (except in very short procedures—like incision and drainage of an abscess), in combination with nitrous oxide and, if relaxation is needed, with curare. This method like spinal anesthesia, can be used with safety in the presence of the cautery and other electrical instruments. Nitrous oxide provides the analgesia (pentothal having no analgesic properties) and appreciably decreases the amount of penthothal necessary. If relaxation had to be procured by pentothal alone, a dose would have to be injected near the toxic level, and the patient would sleep for hours after the operation. When pentothal sodium is used in combination with curare, much less of the former has to be injected to achieve relaxation, and the patient is practically awake when he leaves the operating room.

Curare is not an anesthetic agent, but it is of great help to the anesthetist. It blocks the transmission of nerve impulses to the skeletal muscle at the neuromuscular junction. It has no toxic effect. Death (as in arrow poisoning) is due to asphyxia caused by paralysis of the muscles of respiration. Curare in therapeutic doses causes speedy relaxation before affecting the muscles of respiration. However, intercostal paralysis should always be anticipated, and therefore curare should not be given unless facilities for endotracheal intubation and assisted breathing are available.

These are only two examples. Many such combinations are possible. Vinethene, an unsaturated and thus more toxic and more potent ether, is used for fast induction before ether anesthesia, and so are ethylene and nitrous oxide. Basal anesthesia with avertin followed by nitrous oxide insufflation is a useful combination for children, e.g., in eye operations. Local or block anesthesia can be combined with general anesthesia. Premedication is being used to great advantage. Opiates to decrease metabolism and provide sedation and belladonna drugs to decrease secretions and laryngeal reflexes form an integral part of the anesthetic procedure and have to be individualized for each patient according to the anesthetic chosen.

By this method of combined or "balanced anesthesia,"* we try to overcome the dangers inherent in the administration of today's anesthetic agents.

These dangers are well realized. It is much less common knowledge, however, that the position of the patient on the operating table necessary for certain types of operations may appreciably increase the risk of these operative procedures.

In the Trendelenburg position, the position of choice for all abdominal hysterectomies, cesarean section, some types of bowel resection, suprapubic prostatectomy, etc., the volume of functional residual and reserve air is decreased[2]. This position favors atelectasis by collapsing 20 per cent of the lung tissue; impairs the return of venous blood to the heart, and influences the efficiency of respiration unfavorably by raising the intrapleural pressure

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*Term suggested by Lundy.

(elevation of the diaphragm) Crowding of the thoracic cage in kidney and lithotomy positions has been shown in roentgenograms,[3] indicating a decrease of vital capacity

Recent studies of unanesthetized patients have confirmed the fact that marked decrease of vital capacity occurs with the Trendelenburg and lithotomy positions and when the kidney or gallbladder rests are up[4] The changes were noted within three minutes after the patient was placed in these positions, so it can be assumed that maintenance of the positions during extended operations will even have greater effects

With the lateral position, especially if the patient is heavy, the lower lung is poorly aerated if no special precautions are taken

With Fowler's position the circulation time is increased[5], and so is the danger of aspiration of vomitus if the anesthesia becomes too light

In the head up position fainting may occur after morphine medication in the conscious patient, and loss of postural tone in deep anesthesia will be poorly tolerated

The prone position seems to be most unfavorable for adequate respiratory exchange, a marked decrease in vital capacity is noted[6] and breathing is very tiring for the patient for in this position the weight of the body has to be raised with each inspiration unless the chest is supported adequately Moreover, in this position any obstruction of the airway is more difficult to correct If the cerebellar headrest is used it is impossible to get near enough to the patient's face to improve the airway or give artificial respiration by intermittent pressure on the breathing bag, unless the patient has been intubated previously

Thus we realize that anesthetic procedures have to be selected and conducted carefully for operations in these special positions, it is most important, for instance, that an additional decrease of vital capacity due to the anesthetic procedure is avoided in the Trendelenburg or the prone position, or if the rests are up If deep relaxation is needed whether we supply it by third plane anesthesia or by addition of curare, thus causing beginning or advanced intercostal paralysis, assisted breathing has to be commenced at once, as soon as the slightest decrease in respiratory volume is noted Meticulous care to maintain a free airway is necessary, secretions must be aspirated, care must be taken that the stomach is not being inflated For all these reasons an endotracheal tube is desirable, and in the cerebellar position it is mandatory Low spinal anesthesia will be tolerated well and is often our choice for procedures in positions causing decreased vital capacity But as soon as the operation necessitates high spinal block, which might interfere with intercostal activity, spinal anesthesia is definitely contraindicated

Now we come to the most important factor The condition of the patient Many of our patients are extremely old Arteriosclerosis, changes of the heart and the vessels, emphysema, loss of vital capacity, hepatic and renal disturbances and diabetes are common complications Cardiovascular and respiratory reserve are diminished and added strain from the anesthetic procedure has to be avoided Blood loss is poorly tolerated and blood should be replaced as lost

Transurethral resections in the lithotomy position are a common procedure for patients in this age group Low spinal anesthesia, with very small amounts of the anesthetic drug (e g, 5 mg pontocaine) in our experience is well tolerated and causes no undue fall in blood pressure Oxygen inhalation and blood transfusions are administered during operation Even patients with recent coronary occlusion have tolerated this procedure well, in these cases "saddle block" spinal anesthesia was used, anesthetizing the sacral nerves only, and additional pain relief was supplied by injecting small doses of demerol to take care of the uncomfortable sensation that accompanies distention of the bladder If the procedure is short, or if there are definite contraindications to spinal anesthesia, such as pernicious anemia, subacute combined degeneration, tabes, tuberculosis of the spine, spinal root changes, etc, a pentothal sodium nitrous oxide combination is used, being noninflammable Care must be taken to avoid depression of respiration under pentothal anesthesia

For colon resections and abdominoperineal resections, our method of choice is continuous spinal anesthesia unless there are definite contraindications, with all the precautions outlined before If general anesthesia is chosen, endotracheal intubation is preferred to guar antee a free airway. Previous to intubation the throat is sprayed with cocaine and the endotracheal catheter lubricated with a long lasting anesthetic agent, so that the tube does not cause laryngospasm and cough in a light plane of anesthesia. Relaxation is supplied by curare.

In uremic patients, who may vomit, or after prolonged intestinal obstruction when passive overflow of the stomach is anticipated, or when the patient has eaten previously, local infiltration or block anesthetic procedures are employed. If general anesthesia is chosen, a fast induction must be achieved and the patient should be intubated early, preferably with a cuffed endotracheal tube. The balloon on the tube is then inflated and the trachea sealed off to prevent aspiration. Sometimes it may even be necessary to insert the endotracheal tube in the conscious patient. These principles are the same for patients of all age groups.

In patients with heart disease we have several principles to guide us.

If the heart is decompensated and operation unavoidable, spinal anesthesia is a good choice; it acts like a bloodless phlebotomy. The venous return to the right side of the heart is decreased owing to peripheral capillary dilatation and muscular relaxation caused by the spinal anesthesia[7]. Therefore it is used as a therapeutic measure for pulmonary edema. As a pressor drug, neosynephrine is tolerated well. It slows the pulse, increases the stroke output and prolongs the diastole. It does not cause pulse irregularities; in fact, we have noted time and again that fibrillating stopped, at least for some time. Decrease in the cardiac rate probably comes from a direct effect on the sinus node. If the patients must be put to sleep, slight resistance to breathing, carbon dioxide excess, or hypoxia even of minor degree may cause pulmonary edema.

In patients with disease of the coronary artery our main concern is to avoid a fall in diastolic blood pressure, to prevent cardiac muscle anoxia. Therefore, all but very low spinal anesthesia is contraindicated. General anesthesia will prove more satisfactory, provided induction is smooth and oxygenation high. Since ether dilates the coronary arteries, a cyclopropane-ether sequence will be well tolerated; if cautery or electrical instruments are to be used, a pentothal-sodium-nitrous oxide combination is satisfactory.

When cardiac arrythmia is present before operation we avoid cyclopropane; and we discontinue it when changes in rate or rhythm are noted during a procedure. But cyclopropane is our anesthetic of choice in heart operations, e.g., for repair of a patent ductus arteriosus or for pulmonary stenosis even in a small infant. (Details about the procedure under thoracic surgery). It is very useful too for patients who suffer from recent severe hemorrhage, because of the high oxygenation possible[8]. A rise in blood pressure in these patients is noted soon after the anesthetic has been started.

For patients in shock, e.g., after accidents, every effort should be made first to regulate the fluid balance, restore the blood volume and the normal concentration of the erythrocytes and restore a normal rate of pulse and respiration before commencing any kind of anesthetic procedure. Excellent oxygenation should be secured during the operation.

For young patients with high fever and acute conditions of the abdomen, especially on a hot day, or rise in temperature because of other conditions, we are prepared to avert convulsions. Ice bags are ready in the operating room; the patient is uncovered except for the drapes; the utmost care is taken to avoid the slightest carbon dioxide excess, and pentothal sodium is ready to be injected at the sight of twitchings around the mouth or on the forehead. The so-called "ether convulsions" are due to heat retention, carbon dioxide excess, hypoxia, and the toxic condition of the patient (not due to ether), and if not combated at once they may cause serious oxygen want and hyperthermia; the patient, if he lives, may afterward act like a decerebrated animal.

In premedication for bronchial asthma morphine is contraindicated, and so are the barbiturates. (Sodium pentothal may bring on an attack in an asthmatic patient). Atropine is well tolerated, and ether is known to relax the bronchi, but a slow and stumbling induction with ether can cause increased secretions and obstruction; a fast induction with gas, even cyclopropane, followed by ether might be better tolerated. Helium may be added to the minutes with good results. For any operation below the diaphragm spinal or caudal anesthesia is our method of choice except when the definite contraindications of general [illegible] are present or when unusual blood loss is expected or several liters of ascitic fluid have to be drained out of the abdominal cavity. These conditions are always taken as contraindications to spinal anesthesia.

For thyroid work, excellent preoperative preparation of the patient is necessary to bring the metabolic rate as near normal as possible. Even in well prepared patients, however, the excitement of admission may [illegible] all previous improvements and the patient may arrive in the operating room with a pulse of 140. In such instances we prefer to "steal" the thyroid, that is to put the patient to sleep in bed without letting him know that he is to be operated on. The intravenous procedure is then [illegible] and a pleasant atmosphere is maintained while pentothal sodium is injected until the patient is asleep. He is then transferred to the operating room.

We have been able to achieve uneventful anesthetic procedures in very toxic patients even in cases in which operation had to be cancelled two days previously. In administering anesthesia to the thyrotoxic patient it must be kept in mind that the oxygen consumption is increased.

From all these examples it is evident that there is nothing of routine about the choice of an anesthetic procedure. Each case should be individualized according to the clinical signs with all the individual circumstances taken into consideration.

In a few instances we will invariably make the same choice.

For a splenectomy we prefer ether as the main anesthetic agent because it contracts the spleen and less blood is lost when the organ is removed.

For a diabetic patient we avoid ether.

For a [illegible] in the head [illegible] position [illegible] is preferred so that the conscious patient may help us locate the [illegible].

For eye operations and operations for cataract, we avoid drugs that may cause postoperative vomiting. Pentothal is often chosen but may cause coughing during the operation or on the patient's emergence from anesthesia; therefore its use is limited to minimize cough.

For a patient who has to lie in the prone position for any length of time, endotracheal anesthesia is our method of choice. This guarantees a good airway and enables us to inflate the lungs and assist with respiration. In [illegible] spinal or [illegible] anesthesia will serve as [illegible] or [illegible] respiration.

Endotracheal anesthesia is our method of choice in all operations in the facial area, enabling us to keep our equipment out of the surgeon's way and to assure a free airway. We use it also for operations within the mouth or hypopharynx to prevent aspiration of blood and mucus, and of course in all operations that require opening of the pleura.

In 1904 Sauerbruch, a German surgeon, devised a method for ventilating the lungs by a negative pressure system (Unterdruck). In the Munich clinic a chamber was available large enough to house the patient, the surgeon and his assistants. A negative pressure of 7 mm. of mercury was maintained in the chamber, while the anesthetist remained outside the chamber at the patient's head. This rather elaborate and costly chamber is no longer needed today. We can anesthetize the patient and provide adequate operating conditions for operations on the lung and heart by using "controlled respiration" or "compensated respiration" after intubation with tracheal tube, preferably with an inflatable cuff, maintaining a completely closed system with the carbon dioxide absorber, inflating and deflating the lungs as the operator may wish. Anesthesia is maintained in a light plane; control of respiration is achieved by hyperventilation, thus reducing the carbon dioxide content of the blood and the stimulus for respiration. After apnea is produced the [illegible] is [illegible] alternately, [illegible] and [illegible] respiration being [illegible] by intermittent manual inflation of the breathing bag. The water manometer connected with the system is usually set to blow off at 5 – 20 cm. pressure as a safety valve to prevent overinflation. In a small child the rate of controlled respiration has to be high, 30 to 40 a minute, to change the air in the trachea and bronchi frequently and permit adequate oxygenation and elimination of carbon dioxide. In the "assisted or compensated respiration"[9] the patient is allowed to breathe on his own, but constant slightly augmented inspiratory reinforcement by manual pressure on the breathing bag achieves a quiet field and adequate ventilation. This satisfactory method is used in surgical treatment of the lung, transthoracic gastric resection, thoracic sympathectomy and so on.

The collapsed lung has to be inflated gradually and completely from time to time and at the end of the procedure, just before the chest wall is closed, positive pressure is applied slowly and maintained until the closure is air tight, and the end of a rubber catheter left within the pleural cavity is clamped off.

Frequent aspiration of secretions through the intratracheal tube are especially important during lobectomy and pneumonectomy, but may be needed during cardiac operations as well. Suction through the tube and around the tube has to be carried out before the cuff is deflated and the tube withdrawn. By this time the patient has been allowed to breathe on his own for some time if controlled respiration has been used, and is awake on leaving the operating room.

Great attention to detail is necessary in using these methods. As in every endotracheal intubation, the tube of largest bore tolerable should be used, and should be introduced skilfully. If the to-and-fro absorption technic is used (the method of choice for infants and small children) the right size cannister and breathing bag must be selected carefully according to the tidal volume of the patient. Cannisters have to be changed frequently.

The choice of the agent varies. We prefer cyclopropane with a small amount of ether added, for reasons stated before; others prefer ether, still others pentothal-sodium-nitrous oxide-curare, etc. Far more important is the efficiency with which the agent is supplied and the vigilance and ability of the anesthetist to detect even minor changes in the condition of the patient.

I want to emphasize the necessity of maintaining proper fluid balance during operations, and the importance of preoperative rounds by the anesthetist. These rounds are indispensable in evaluating the condition of the patient to determine the anesthetic procedure of choice and the proper premedication.

SUMMARY

The author describes various modern anesthetics and the technic of their use, with specific warnings as to potential dangers, indications and contraindications. Strong emphasis is laid on the general physical condition of the patient, the importance of adequate knowledge and skill on the part of the anesthetist as well as the surgeon, and the necessity of maintaining proper fluid balance throughout the operative procedure.

SOMMAIRE

L'auteur décrit différents anesthésiques et donne en même temps la technique de leur emploi, en notant leurs dangers possibles, et leurs indications et contre-indications.

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Tuberculosis of the Urinary Tract: Medical-Surgical Management

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FOR many years tuberculosis of the urinary tract presented an utterly hopeless problem to the physician, particularly after the initial lesion had progressed to any degree. The prognosis was grave indeed, and the patient's remaining life foredoomed to the misery and inconvenience of frequency, urgency and dysuria.

The use of phenol, oleo-gomenol, quartz and ultraviolet rays was only palliative, resorted to when operation was contraindicated or when it had been tried and had failed to eradicate the disease. With the advent of streptomycin and chaulmoogra oil therapy, first suggested by Slotkin,[1] the prognosis of this particular malady has become definitely more favorable and the patient's existence a great deal less oppressive.

The tubercle bacillus is protected by an armor-like shell of wax. To destroy the bacillus, this shell of wax must be broken, digested or dissolved. It cannot be saponified. Wax is digestible only by a few insects, including the bee moth. It is not digestible in the human being. It can, however, be softened or dissolved by various oils, as was pointed out by Slotkin in his experimental and clinical work with urinary tuberculosis. He used the esters of chaulmoogra oil as the softening agent, believing that a softening process should precede the use of streptomycin. Thus employed, the antibiotic should prove most effective with a minimum nontoxic dosage.

In a recent paper on the medical treatment of this condition, presented before the South Central Section of the American Urological Association, I concluded as follows:

1. Medical treatment with small nontoxic doses of streptomycin in combination with the esters of chaulmoogra oil in the cases presented brought about remarkable clinical improvement and relief of distressing symptoms for as long as one year after therapy.
2. The tubercle bacilli were still present twelve months and eight months respectively after therapy in 2 of the cases presented, as evidenced by positive results from inoculated guinea pigs.
3. The value of this therapy for early tuberculosis of the urinary tract could not be ascertained from the cases reported.
4. The therapy has definite value preoperatively, postoperatively, and in cases of advanced inoperable tuberculosis of the urinary tract.

From other written and verbal reports on the use of the combined medical treatment, it becomes evident that this new therapy has earned a rightful place in the treatment of tuberculosis of the urinary tract. Its exact position has not as yet been definitely determined, but it is beyond question invaluable and indispensable. We must therefore conclude that the treatment of this condition has progressed from palliative-surgical to medical-surgical. Rational combinations and applications of medical and surgical measures are therefore in order.

CLASSIFICATION AND THERAPY

For the purpose of treatment this disease must be divided into two categories; tuberculosis of the genito-urinary tract in the male and tuberculosis of the urinary tract in the female. Because of this anatomic difference, the prognosis generally is much more favorable for the female patient. A further classification may be made as to early or late manifestations of the disease; the condition is "early" when limited largely to the initial lesion, and "late" when other areas of the urinary tract have become involved. Operable and inoperable lesions complete the groupings: the condition is operable when medical therapy has failed to eradicate the caseous tissue and surgical intervention is necessary to remove

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the remaining foci of infection; it is inoperable when destruction has become too extensive to permit removal of all remaining foci of infection by surgical means. Active and progressive evidence of the disease coexisting elsewhere in the body may, of course, alter the prognosis in the treatment of genitourinary lesions.

Early Involvement. Under this heading are cases in which only one kidney is involved, with only slight pyelographic evidence of a destructive process or no evidence at all. The treatment is medical and should be continued for at least sixty days. Follow-up cystoscopic examinations and guinea pig inoculations of urine must be repeated at intervals. The prognosis of early tuberculosis of the urinary tract is definitely favorable with medical treatment alone. Surgical intervention is contraindicated at least until after adequate medical therapy has been tried.

Late Involvement. This category includes cases in which the disease has progressed beyond its original site, with extension to, or involvement of, other portions of the urinary tract. Late tuberculosis of the urinary tract may be either operable or inoperable. If it is operable, immediate operation is indicated in some cases and delayed operation in others.

Late Involvement Calling for Immediate Intervention. Cases in which immediate intervention is called for are those in which destruction and caseation of a removable organ have progressed so far that restoration of function by medical therapy is impossible and in which the general condition of the patient has not been materially affected. Simply stated, a completely destroyed removable organ should be removed immediately if the patient's general condition does not contraindicate immediate operation. In such a case medical therapy should be instituted shortly prior to operation and should be continued afterward for at least sixty days. The prognosis is favorable.

Late Involvement Calling for Delayed Intervention. Cases in which surgical intervention should be delayed are those in which the disease has affected the patient's general condition to such a degree that blood transfusions and a general building-up regime are necessary to make him a good surgical risk. Medical therapy should be instituted immediately and continued for thirty to sixty days prior to operation, after which it should be maintained for at least thirty additional days. The prognosis is surprisingly favorable.

Inoperable Conditions. Inoperable tuberculosis of the urinary tract is encountered when both kidneys are involved in the destructive process. Other organs, particularly the male genitals, may or may not be involved with the bilateral renal disease. With bilateral involvement and with little or no pyelographic evidence of destruction, the prognosis may prove favorable with medical treatment.

Inoperable tuberculosis of the urinary tract should be given at least sixty days of continuous medical therapy. The prognosis is generally guarded. It is possible that an inoperable condition may become operable after long continued medical therapy.

SUMMARY

The author points out that medical treatment of tuberculosis of the urinary tract with small nontoxic doses of streptomycin combined with chaulmoogra oil has earned its place in the therapeutic practice. As a result, treatment of this form of tuberculosis has progressed from palliative-surgical to medical-surgical. Logical combinations and applications of medical and surgical treatment are therefore in order.

A therapeutic classification of the various types of tuberculosis of the urinary tract is presented. Indications for medical and surgical procedures adapted to each type are outlined.

RIASSUNTO

L'associazione di picole dosi, non tossiche, di streptomicina con olio di chaulmoogra e' stata definitivamente accettata nella terapia medica della tubercolosi urinaria. Cio' ha condotto al passaggio delle cure palliative—chirurgiche alle cure medico-chirurgiche. L'A. presenta una classificazione terapeutica delle diverse forme di tubercolosi delle vie urinarie: discute le indicazioni mediche e chirurgiche per ognuna di queste varieta'.

SOMMAIRE

L'auteur discute le traitement médical de la tuberculose des voies rénalés a l'aide de petites

doses non toxiques de streptomycine combinée avec de l'huile chaulmoogra Il en résulte que cette forme de tuberculose n'est plus soumise de nos jours à un traitement palliatif chirurgical mais à un traitement médico chirurgical Une combinaison logique et une application du traitement médical et chirurgical doivent être employeés sans danger dans les cas de cette nature

L'auteur présente une classification thérapeutique des différentes catégories de tuberculose des voies rénales Il indique le procédé médical et la procédé à employer suivant chaque type

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The United States Chapter of the
International College of Surgeons

announces the creation of Junior Membership in the College The House of Delegates, meeting on Dec 18, 1949, established this new form of membership, with the following requirements

One year of internship in an approved hospital
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Secretary, International Board of Surgery
1516 Lake Shore Drive
Chicago 10, Ill

A Plea for Complete Adenoidectomy

THOMAS F. FURLONG, JR., M.D., F.A.C.S., F.I.C.S.
ARDMORE, PA.

TONSILLECTOMIES and adenoidectomies, because of the early and proper use of chemotherapeutic agents and antibiotics, are speedily becoming the most common operations performed by otolaryngologists today. Although some few members of our specialty limit themselves to rhinoplastic surgery and others to the performance of the fenestration operation, while still others confine themselves to the practice of bronchology, esophology, the laryngeal surgery; statistics bear out the fact that the tonsillectomy and adenoidectomy, or so called "T & A," heads the list in the number of otolaryngological operations performed.

A typical example of this is the following résumé of ear, nose and throat operations performed at the Bryn Mawr Hospital, Bryn Mawr, Pa., during the year 1946.[1] The total number of operations was 1,207. Of these 1,110 were tonsillectomies and adenoidectomies, 55 were submucous resections, 21 were myringotomies, 13 were nasal and aural polypectomies, 3 were "window operations" and only 4 were mastoidectomies. The mastoidectomies performed at this particular hospital were only 0.0033 per cent of the total. Before the advent of chemotherapy and antibiotics, the percentage of mastoidectomies and surgical procedures on the sinuses was much higher.

This article makes no attempt to change our technic radically, nor am I advocating the addition of any new surgical procedures. I am merely making a plea for all of us to use, when properly indicated, *all* the instruments devised for adenoidal surgery, so that the adenoids may be as thoroughly and completely removed as the tonsils usually are. May I also specifically state that this is no substitute for the methods of irradiation advocated by Crowe,[2] Baylor,[3] Fisher[4] and many others in those cases in which lymphoid tissue is actually present in the eustachian tube orifices or in the tubes themselves.

Most surgeons do a *complete* tonsillectomy, but many are not so diligent in performing the subsequent adenoidectomy. I am convinced that a thorough and complete removal of the adenoids is as important as a thorough and complete removal of the tonsils. Fowler, in his excellent book "Tonsil Surgery",[5] devotes a great deal of space to the description of various technics of tonsillectomy, but, and I quote the following, there is this description of an adenoidectomy: "Their removal is therefore a comparatively simple matter and can be accomplished either by an instrument like the La Force adenotome, which depends upon the automatic action of a thin blade in a double slot, or with a light curettage."

Preoperative office examination of the adenoidal area should consist of the following. 1. The proper use of a postnasal mirror (size 1 or 2 is usually most suitable). 2. A digital examination, using a gloved finger or the index finger covered by a finger cot. It may be necessary to anesthetize the area locally before the finger is introduced through the mouth into the pharynx. By turning the finger upward into the nasopharynx and then forward, one can feel the posterior nares separated by the vomer. Sweeping laterally and posteriorly, one can evaluate the extent and position of the adenoidal mass. Two wooden tongue depressors should be inserted between the upper and lower jaws of the patient to prevent trauma to the examiner's finger. 3. A nasopharyngoscopic examination is usually possible and provides further information as to the extent and position of the adenoids, particularly if they encroach upon the eustachian tubes.

For patients who have undergone a previous adenoidectomy, or for older children and adults, the use of the following instruments is recommended to rule out the presence or absence of adenoidal tissue: a Yankauer eustachian or pharyngeal speculum is needed for adequate further visualization. The Hollender pharyngoscope[6], a new and decidedly valuable instrument which, because it is longer

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than the Yankauer pharyngoscope, provides increased vision of a wide area and has a further advantage in that it may be used with either direct or indirect illumination Love, Wood, Furlong or similar pharyngeal retractors may also be used to estimate the position and size of the adenoids

The tonsillectomy should be done first, as this definitely facilitates visualization of the adenoidal area After this an adenotome (the one used depending entirely upon the personal preference of the surgeon) is inserted behind the uvula, then brought anteriorly until it engages the posterior portion of the vomer and opened The adenotome is then placed posteriorly over the large central adenoidal mass, and with *moderate* pressure and a *gentle* rocking motion the blade is closed This may remove the entire adenoidal mass, but generally does not do so, hence it is usually necessary to reinsert the adenotome and either move the whole instrument laterally or rotate it through an angle of 45 degrees to get the pieces of tissue remaining in that area Frequent digital and direct visual examination with use of a pharyngeal retractor, will also detect the presence of any remaining lymphoid tissue An adenoid curet is then used with a gentle sweeping motion to aid further in removal of this tissue

As has been mentioned by Imperatori[8], the adenoids may drop out of the curette *even* when the caged type is used, hence this is the chief objection to the instrument One must caution one's assistant to be on the alert and remove any tissue that has been swept down into the pharynx One must *never* forget the possibility that some of the detached tissue may enter the respiratory tract and result in pulmonary complications

Next the tonsil punch is used, either the Hartman circular or the Schmeden triangular punch These instruments are invaluable in the removal of lymphoid tissue from the regions of the posterior pillars, the fossae of Rosenmuller, and the posterosuperior angle of the nasopharynx Both the adenotome and the curet are likely to miss small amounts of tissue in the latter area Since this is a punch instrument, it should be used as such and not with a stripping or sweeping motion, because severe cicatrization even to the point of complete stenosis may result from its misuse, should the nasopharyngeal mucosa be severely torn or destroyed It is important to mention that all the cutting surfaces of the adenotome curet and tonsil punch should be maintained at "razor sharpness" to avoid tearing, stripping or the complete destruction of the mucosa on the nasopharyngeal and postpharyngeal walls

The gloved finger covered with one or two thicknesses of a 4 x 5 inch piece of surgical gauze makes an excellent supplementary curet without causing too much trauma Many times this will remove very small pieces of lymphoid tissue that the aforementioned instruments have completely missed or slipped over I advocate that almost forgotten instrument, the nasal dilator Over fifty years ago Sinexson of Philadelphia developed this instrument and recommended its use By it one can determine whether the nasal airways are adequate and by using it gently one may correct small septal deformities early This dilator often pushes unsuspected aberrant lymphoid tissue into the nasopharynx where it can be seen and removed When the surgeon is convinced by visual and digital examination that all of the lymphoid tissue has been removed from the nasopharynx, an Eves forceps or similar instrument containing a tonsillar sponge is placed in the operative area This sponge may be either plain or lightly coated with a solution of equal parts of tannic and gallic acid The sponge is left in place a few moments, gentle pressure being used on the instrument, and may be replaced if further bleeding indicates it If the operative area is dry, the operation is completed

SUMMARY

The author recommends strongly that judicious use be made of various instruments to perform complete and thorough adenoidectomies and not adenoidotomies and that adenoids be removed with as much skill and care as are used in the removal of tonsils

RIASSUNTO

Raccomanda l'uso giudizioso di strumenti vari allo scopo di eseguire delle adenoidectomie complete e non delle semplici adenoidotomie

Le adenoidi vanno rimosse con altrettanta abilita' quanto le tonsille.

SOMMAIRE

L'auteur recommande l'emploi judicieux de différents instruments pour faire une adénoïdectomie complète et non une adénoïdotomie. Les adénoides doivent être enlevées avec autant de précautions et de soins que pour l'ablation des amygdales.

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The publication date of the

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of the International College of Surgeons

is approaching. Those who have not in their new addresses or proper teaching ns will please do so immediat members of the United States Chapter sh these data to 1516 Lak Drive, Chicago 10. Ill. International mem write to the Secretar Dr. Max Thorek. 850 West Irving Park, .. U.S.A.

Acute Intussusception in Adults: Cause and Treatment

Report of Two Cases

J H BRADY, M D , A I C S
VISALIA, CALIF

ACCORDING to Lewis' *Practice of Surgery*, practically 100 per cent of intussusceptions in adults are caused by organic lesions in the bowel, half of these probably being caused by Meckel's diverticula, which may or may not have invaginated Most of the remaining 50 per cent are caused by tumors of the bowel, either benign or malignant Only 25 per cent of intussusceptions occur in adults, and many of these are found at autopsy The following case reports therefore, would seem to be of considerable interest, since in both the condition occurred in young adults, 1 of the patients was male and 1 female, and both recovered rather rapidly after immediate surgical treatment (operation performed within twenty four hours of occurrence of the intussusception)

DIAGNOSIS

The diagnosis of acute intestinal obstruction caused by intussusception is made from the clinical observation findings as well as from symptoms, which usually consist of sudden, severe abdominal pain followed by nausea and vomiting and then by a stool, either liquid or normal, perhaps containing blood Shock may or may not ensue, but after twenty four hours the patient is usually prostrated and in shock and the abdomen is distended A sausage shaped abdominal mass is often visible as well as palpable Peristaltic sounds are increased, and a roentgenogram of the abdomen or a barium enema film may give valuable additional evidence

REPORT OF CASES

Case 1 A white man aged 24 was seized with sudden abdominal pains on Dec 1, 1948, with increasing intermittent cramps, nausea vomiting and one loose stool He presented the typical picture as afore described, including a large sausage shaped mass in the right lower abdominal quadrant The temperature was 100 3 F There was no severe shock, though he was first seen nine hours after onset of illness The leukocyte count was 19,000 per cubic millimeter of blood, with 81 per cent polynuclear cells Operation was delayed almost eight hours owing to technical difficulties in the operating room At operation, with the region under spinal anesthesia, a large intussusception of ileum into ileum was observed After reduction by manipulation, the cause was found to be an intrinsic lesion of the ileum, requiring resection, side to side anastomosis and a proximal ileostomy Recovery was uneventful, except that two weeks later closure of the ileostomy was performed under GOE anesthesia The pathologic diagnosis was Grade 2 adenocarcinoma of the ileum, the tumor mass measuring approximately 5 cm in diameter

Case 2 A white woman aged 41 had been losing weight and having ulcer like abdominal pains off and on for a year or more Roentgen examination of the entire gastrointestinal tract had failed to reveal any intrinsic lesions, clinically, nevertheless peptic ulcer was strongly suspected The patient received a partial course of emetine, since amebiasis was also suspected (though never proved) but during this treatment a sudden attack occurred consisting of severe cramplike abdominal pains nausea, vomiting and remission of stools for twenty four hours Examination revealed a typical sausage shaped abdominal mass, both palpable and visible, with tinkling peristaltic sounds The temperature was 99 4 F Immediate operation for intestinal obstruction, probably due to intussusception, was deemed advisable This was performed, with the region under spinal anesthesia, approximately five hours after onset An ileocolic intussusception was found This was reduced with some difficulty, and it was seen that the circulation of the mesentery was not irreversibly involved The cause of the intussusception was a cylindric mass inside the ileum, which was thought to be a large polyp After incision of the ileum this mass was removed It proved to be a large inverted Meckel's diverticulum, having two typical peptic ulcers at its tip The inverted base of the diverticulum arose from the mesenteric border of the ileum approximately 10 inches (25 cm) proximal to the ileocecal valve. The diverticulum was removed, without reduction of its inversion, through an ileostomy opening, the ileum then being closed about an ileostomy tube. Recovery was uneventful. The pathologic diagnosis was chronic Meckel's diverticulitis (with ulcers).

TREATMENT

The treatment of intestinal obstruction due to intussusception, as described, consists of immediate surgical intervention: manual reduction of the intussusception if possible, resection of the organic lesion responsible for the intussusception, and ileostomy if deemed advisable. More extensive surgical procedures are to be condemned unless absolutely necessary, e.g., when manual reduction is not possible, or when the condition is of long standing and irreversible circulatory changes have taken place. The prognosis, of course, in the latter cases is much more guarded. Expectant treatment should definitely be condemned when intussusception is suspected.

SUMMARY

A short historical review of intusseception as a cause of intestinal obstruction in adults has been given. Two cases are reported—one an adult male, the other an adult female—
one caused by tumor, the other inverted
Meckel's diverticulum, in whor tm
consisted of immediate operation.
uneventful recovery took place.

SOMMAIRE

L'auteur fait une revue historiqu
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valesce

RIASSUNTO

Breve rassegna dell'intuscezione quale causa di ostruzione intestinale. Riporta due casi del genere, riguardanti ambedue adulti: il primo causato da un tumore, il secondo da un'inversione del diverticolo di Meckel. La guarigione e' stata perfetta, senza alcuna complicazione postoperatoria.

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Surgical Therapy of Carcinoma of the Larynx

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IN THE *therapy of laryngeal cancer there* are two parallel trends, one toward surgical treatment and the other toward roentgen irradiation Irradiation is promising with certain initial mobile patterns only Surgical treatment, of course, has a better prognosis if it is done at an early stage The results of operation are greatly impaired by the presence of metastases in the cervical lymph nodes even in this case, though the prognosis is not entirely unfavorable Great importance should be attributed to the operative indications The method and extent of the operation depend on the site and extent of the tumor

In the case of an epiglottic cancer, particular deliberation is needed There are three possible situations

1 The tumor is seated at the top of the epig'ottis It is sharply limited and it has not spread to the deep tissues These conditions should be verified not only by the regular laryngoscope but by direct laryngoscopic study In such cases the tumor is removed, with much intact surrounding tissue, by a direct approach After operation, its total removal should be checked by histologic examination

2 The cancer of the epiglottis has penetrated beyond the anterior commissure into the deep tissues and the vocal ligaments have been involved In these circumstances only *extirpation of the larynx can be considered*

3 The cancer of the epiglottis extends above the anterior commissure This is infrequent Radical procedure is advisable, however, one should not perform a total extirpation The epiglottis is approximated through a transverse pharyngotomy

The two operations usually performed, i e , suprahyoid and subhyoid pharyngotomy, involve the risk that, owing to division of the muscles above or below the hyoid bone, energetic muscular traction after the operation may result in dehiscence of the wound This danger can be eliminated by the application of my procedure

First a tracheotomy is performed, then the hyoid bone is exposed, level with its corpus through a transverse incision, with the region under local anesthesia The muscles are divided in the region of the corpus and the cornua below and above the hyoid bone respectively Close to both ends of the corpus, the bone is sawed through along an oblique line running upward and inward Finally the pharyngeal mucosa is severed, the pharyngeal cavity being opened thereby Thus the epiglottis can be radically removed If abundant bleeding occurs, aspiration may be prevented by introducing a Bellocque tube through the tracheostomy With the aid of this tube, a pear shaped swab fastened to a silk thread can be drawn in The corpus of the hyoid bone, temporarily excised, can be fastened in its original place by means of two canals (bored either at this stage or before sawing through the bone After the muscles have been sutured, wound separation is prevented by the suprahyoid muscles adhering to the hyoid corpus and the infrahyoid ones adhering to the cornua

There is still another interesting possibility with regard to the epiglottis If a cancer of the epiglottis has involved the base of the tongue or if a cancer starting at the base of the tongue has involved the epiglottis, operation implies the danger of postoperative aspiration pneumonia, *which cannot be avoided except by* total extirpation of the larynx In such cases the following procedure has proved itself in my experience Twelve to 14 days before the main operation, the laryngeal cavity is separated *from the pharynx by uniting the vocal* ligaments, then the most radical procedure employed in removal of the tumor can be performed without danger of aspiration The vocal ligaments are united as follows The laryngeal cavity is opened by laryngofission including the two upper cartilages of the air pipe The epithelial coat is scraped off both vocal ligaments and commissurae, then the ligaments are united by interrupted sutures

Thus the pharynx has been separated from the larynx. A cannula is inserted. Healing is undisturbed.

As I have mentioned, the vocal ligaments are sutured mainly for cancers of the epiglottis in which the base of the tongue is involved. This procedure is applied also, however, when the cancer has not come near the commissura but the aryepiglottic folds or the false ligaments are infiltrated without involvement of Morgagni's pouches. In these cases radical extirpation of the larynx is unnecessary, because the aryepiglottic folds can be removed, together with the false ligaments, without any danger. The suitable approach is again the transverse pharyngotomy, but the hyoid bone is removed, its presence not being required. After the cancer has been radically extirpated, the wound is left open. Through the wound a tube is introduced into the gullet for nutritional purposes, while the pharyngeal cavity is loosely filled with sponges. After the healing of the mucosal wound, the fenestra formed on the anterior wall of the pharynx is to be closed. To this end, two skin flaps like door wings are prepared, one on each side of the fenestra, and dissected off; then they are turned inward and united. Thus an inner epithelial lining has been formed. In order to cover the external skin defect, a transverse incision, forming on both sides a continuation of the inferior border of the defect, is made, and the triangular flap prepared in this way is dissected off; then the superior angle of one flap is fastened to the angle of the superior skin defect of the other side, while the lower half of the skin defect is covered by the other flap. Thus the defect of the pharyngeal wall has been fully covered.

If the laryngeal cancer is situated on the vocal ligaments without involving the arytenoid cartilages and the vocal ligaments are still mobile, removal of the diseased parts after opening the larynx may be taken into account. If the arytenoid cartilage is infiltrated by the cancer, while the commissura has not yet been infiltrated but the vocal ligament is fastened, I carry out a hemilaryngectomy. If, however, the commissura too is infiltrated, total laryngectomy is the operation of choice. In this case, the radical procedure should be associated with primary wound healing. My procedure aiming at total laryngectomy which was discussed in the twenties and widely adopted later usually results in primary healing of the wound. From this point of view, in addition to sterile operation and careful control of hemorrhage, it is important to prevent contamination of the wound with saliva. A skin incision is passed above at the level of the hyoid bone and below the cricoid cartilage. The two transverse incisions are connected along one of the sternomastoid muscles. The skin flap is dissected off laterally. The sternothyroid and the thyrohyoid muscles are removed. The vessels supplying and draining the larynx are tied. The isthmus of the thyroid gland is separated from the first tracheal ring, and the constrictor pharyngis muscle is dissected off the side of the larynx. The lymph nodes lying on the jugularis are removed. The upper part of the air pipe is fully separated from the esophagus. Then, through a transverse section, the tracheolaryngeal junction is divided, a sponge is placed into the lumen of the larynx, and the tracheal wall is fastened to the skin with stitches. The corpus of the hyoid bone and a part of the greater cornua are then removed, and the mucosa of the posterior larynx wall and recessus pyriformis is dissected off.

Owing to removal of the hyoid bone, the pharyngeal muscosa can, after extirpation of the larynx, be united in a tangential line instead of a T-union. The pharyngeal cavity is opened at the posterior aspect of the larynx, and the lowermost part of the mucosa wound is supplied with a thin catgut stitch.

During gradual removal of the larynx the defect is united with nontransfixing sutures. Thus the outflow of the saliva from the pharynx into the wound is prevented. A continuous catgut suture is then applied, not transfixing the mucosa. Then the constrictor muscles and the fascia are united. The posterior half of the trachea is united with the skin. The upper and lower ends of the wound are each furnished with a rubber tube filled with gauze, which is to remain in position for one to two days only.

The sutures of the air pipe are removed on the second day. For two days rectal feeding should be done. No nutritive catheter is applied lest the mucosal wound be stretched.

After the second day oral nutrition is permitted, as first only fluids are given, which must not be swallowed but shed through the mouth, into the stomach Of course, penicillin is administered after the operation

The procedure results in primary wound healing, and salivary fistula is an exceptional event occurring only when a late hematoma has developed despite the careful control of hemorrhage

SUMMARY

The surgical treatment of laryngeal carcinoma is discussed, with particular emphasis on a careful evaluation of the indications for intervention The special implications of carcinoma involving the epiglottis are pointed out The author believes that suprahyoid and subhyoid pharyngotomy as usually performed "involve the risk that, owing to division of the muscles above or below the hyoid bone, energetic muscular traction after the operation may result in dehiscence of the wound" He presents a technic for avoidance of this and other complications, which in his hands has given highly satisfactory results

RIASSUNTO

Discute la cura chirurgica del cancro della laringe, con particolare riguardo alle indicazioni operatorie Sottolinea le speciali condizioni che derivano dall'invasione dell'epiglottide Ritiene che la faringotomia sopra ed infrajoidea, quale viene comunemente eseguita, involva il rischio di una deiscenza della ferita in seguito a squilibri muscolari derivanti dalla scissione dei muscoli al disopra ed al disotto dell'osso joide Presenta quindi delle nuove modalità tecniche atte ad evitare queste ed altre complicazioni postoperatorie

SUMARIO

Se discute el tratamiento quirurjico del cancer de la laringe y sus indicaciones Se apunta las implicaciones del cancer de la epiglotis El autor cree que la faringotomia tal como se practica con division de los musculos supra o infra hyodes, aumenta el peligro de la deshicencia de la herida debido a la traccion energetica muscular durante el periodo post operatorio El presenta una tecnica operatoria que evita esta, y otras complicaciones, y que segun el da muy buenos resultados

SOMMAIRE

Le traitement du carcinome du larynx est discute ainsi qu'une évaluation soignee des indications de l'intervention Le carcinome étendu à l'épiglotte présente des difficultés L'auteur croit qu'une pharyngotomie supra hyoide ou subhyoide entraine le risque que la section des muscles supérieurs ou inférieurs prédisposent à la déhiscence postopératoire de la plaie due à la traction énergique des muscles Il présente une technique permettant d'éviter ces complications et qui lui a donne d'excellents résultats

Case Report

Cancer of the Large Intestine Complicated by Pregnancy

MELVIN SCHLEMENSON, M.D., A.I.C.S., FRANK E. RUBOVITS, M.D.,
AND BERNARD ABRAMS, M.D.
CHICAGO, ILL.

A CASE of cancer of the rectosigmoid portion of the large intestine complicated by pregnancy is presented.

Banner, Hunt, and Dixon,[1] Finn and Lord,[2] and Der Brucke[3] reported some 70 cases of concomitant cancer of the large intestine and pregnancy. From the study of the recorded cases, the following impressions were gained: The majority of patients were in the fourth decade of life; the youngest was a primagravida aged 23; with the exception of the youngest, all were multiparous; the symptoms were essentially those of cancer of the large intestine. The diagnosis, in many cases, was not made until the last trimester of pregnancy because symptoms, sometimes noted early in pregnancy, were too frequently attributed to gestation. The most common complications of the cancer, in the treated and untreated patients were intestinal obstruction and peritonitis. Treatment varied according to the duration of pregnancy, the location and extent of the cancer, the presence or absence of intestinal obstruction, and the condition of mother and fetus. In general, in those cases in which the cancer was diagnosed early in pregnancy, immediate treatment was begun by whatever surgical method seemed most feasible. In that group the prognosis for both mother and fetus was best. When the diagnosis of cancer was made later in pregnancy, delivery of the fetus by the most practicable obstetric procedure (either cesarean section or induced labor) followed by definitive treatment of the cancer was the procedure most frequently employed.

In many cases the cancer was inoperable when the diagnosis was made, and both maternal and fetal mortality were high. Banner, Hunt and Dixon[1] found the maternal mortality to be 63 per cent in 41 reported cases in which the final outcome was known. In addition, the gross fetal mortality in 62 cases, was 50 per cent where surgical treatment was employed. In seven cases of their own the maternal mortality and corrected fetal mortality were substantially lowered. The prognosis of acute intestinal obstruction due to cancer during pregnancy is grave. Finn and Lord[2] have reported the case of the only patient who survived.

CASE REPORT

A. U., a woman aged 42, para II, gravida III, in the eighth month of pregnancy, was admitted to the Chicago Tumor Institute Oct. 10, 1946, complaining of rectal bleeding and alternating constipation and diarrhea of approximately four months' duration. In addition, there were decrease in the calibre of the stool, tenesmus, and rectal pain. These symptoms had become progessively worse. There were no untoward symptoms referable to the pregnancy. Two previous pregnancies had been uncomplicated, and the past history and family history were noncontributory.

Examination disclosed the abdomen enlarged to the size of an eight months' pregnancy. There was cephalic presentation. Rectal examination revealed a papillary tumor 5 cm. in diameter on the anterior rectal wall, approximately 8 cm. from the anal margin with slight anterior fixation. The remainder of the examination revealed no abnormality.

On Oct. 14, 1946, a cesarean hysterectomy and bilateral salpingo-oophorectomy were performed. A normal male infant weighing six pounds was delivered. At this operation the tumor of the rectosigmoid was found to be freely movable and deemed amenable to primary resection at another operation. The patient had an uneventful recovery. Lactation was suppressed, and the patient and child left the hospital on the eleventh postoperative day. On Nov. 20, 1946, after routine preparation of

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the intestine, a primary resection of the tumor at the rectosigmoid junction and an end to end anastomosis were performed by another surgeon No metastases were palpable in the liver The microscopic diagnosis was mucinous adenocarcinoma of the large intestine with extension to the serosa and metastasis to a regional lymph node

The postoperative course was uneventful, and the patient was discharged from the hospital on the fifteenth postoperative day She was last seen in September 1948 There was no evidence of cancer The child was reported to be a normal infant

Comment In this case, the obstetric procedure described was chosen to facilitate the treatment of the cancer Hysterectomy minimized the technical difficulty of intestinal resection We were fortunate to deliver a viable fetus, however, that was not a primary consideration

Marked tumescence and vascularity of the cancer, noted at the first operation, had largely subsided at the second In our opinion this was part of the involution following the termination of pregnancy, and it would have been dangerous to attempt intestinal resection before involution had occurred However, there was no evidence that the pregnancy affected the cancer

Antibiotics and blood transfusions were exceedingly important in the management of this case, and it is to be expected that because of these agents the mortality will be greatly reduced In addition, the increasing education of the physician and the patient about cancer will aid in earlier diagnosis, which will assist in reducing the mortality

The obstetric management should be conducted in a manner that allows the earliest and most definitive treatment of cancer It should be emphasized that the pregnancy constitutes a complication and must in no way be allowed to interfere with the optimal attack on the primary disease

SUMMARY

Cancer of the large intestine complicated by pregnancy is rare, the mortality rate for both mother and child is high, first consideration must be given to treatment of the cancer A case of cancer of the rectosigmoid portion of the large intestine complicated by pregnancy, with survival of mother and fetus, has been presented The use of antibiotics and the newer knowledge about blood and fluid transfusions will aid in materially reducing the mortality Symptoms referable to the large intestine during pregnancy must be given careful evaluation

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Case Report

Cancer of the Large Intestine Complicated by Pregnancy

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A CASE of cancer of the rectosigmoid portion of the large intestine complicated by pregnancy is presented.

Banner, Hunt, and Dixon,[1] Finn and Lord,[2] and Der Brucke[3] reported some 70 cases of concomitant cancer of the large intestine and pregnancy. From the study of the recorded cases, the following impressions were gained: The majority of patients were in the fourth decade of life; the youngest was a primagravida aged 23; with the exception of the youngest, all were multiparous; the symptoms were essentially those of cancer of the large intestine. The diagnosis, in many cases, was not made until the last trimester of pregnancy because symptoms, sometimes noted early in pregnancy, were too frequently attributed to gestation. The most common complications of the cancer, in the treated and untreated patients were intestinal obstruction and peritonitis. Treatment varied according to the duration of pregnancy, the location and extent of the cancer, the presence or absence of intestinal obstruction, and the condition of mother and fetus. In general, in those cases in which the cancer was diagnosed early in pregnancy, immediate treatment was begun by whatever surgical method seemed most feasible. In that group the prognosis for both mother and fetus was best. When the diagnosis of cancer was made later in pregnancy, delivery of the fetus by the most practicable obstetric procedure (either cesarean section or induced labor) followed by definitive treatment of the cancer was the procedure most frequently employed.

In many cases the cancer was inoperable when the diagnosis was made, and both maternal and fetal mortality were high. Banner, Hunt and Dixon[1] found the maternal mortality to be 63 per cent in 41 reported cases in which the final outcome was known. In addition, the gross fetal mortality in 62 cases, wa 50 per cent where surgical treatment was en ployed. In seven cases of their own the m ternal mortality and corrected fetal mortali were substantially lowered. The prognosis acute intestinal obstruction due to cancer d ing pregnancy is grave. Finn and Lord[2] l reported the case of the only patient survived.

CASE REPORT

A. U., a woman aged 42, para II, gravida the eighth month of pregnancy, was admi the Chicago Tumor Institute Oct. 10, 19 plaining of rectal bleeding and alternati stipation and diarrhea of approximat months' duration. In addition, there were in the calibre of the stool, tenesmus, a pain. These symptoms had become p worse. There were no untoward sympt able to the pregnancy. Two previous had been uncomplicated, and the past family history were noncontributory.

Examination disclosed the abdomen the size of an eight months' pregnan cephalic presentation. Rectal examin a papillary tumor 5 cm. in diamet terior rectal wall, approximately S anal margin with slight anterior f mainder of the examination reve mality.

On Oct. 14, 1946, a cesarean h bilateral salpingo-oophorectomy A normal male infant weighing delivered. At this operation the t sigmoid was found to be fr deemed amenable to primary r operation. The patient had an ery. Lactation was suppressed, child left the hospital on the el day. On Nov. 20, 1946, after r

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extremidad inferior izquierda Cuatro dias mas tarde notamos una hemiplegia izquierda espástica En este momento se hizo una ventriculografia que indicó la presencia de una masa en la region temporal derecha (Fig 1) A continuacion una craneoplastia derecha permitio la evacuación de un hematoma intracerebral del lobulo temporal que ocupaba una cavidad de 10 cm de diametro Veintidos dias mas tarde la hemiplegia desaparecio por completo En este momento pudo demostrarse una hemianopsia homonima izquierda

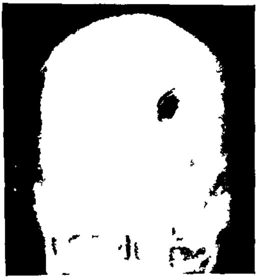


Fig 1 (Caso 1) Ventriculograma Vista anteroposterior mostrando un desplazamiento del sistema ventricular hacia la derecha A través de un colgajo temporal izquierdo se evacuo una hematoma intracerebral del lóbulo temporal izquierdo Nótese la fractura del cráneo en la región temporal izquierda

Los ventriculogramas deben ser hechos y repetidos en cualquier momento del curso clínico que haya un deterioro o estacionamiento clínico alarmantes A veces después de extraer un hematoma el enfermo mejora y mas tarde empeora En este caso un ventriculograma nos dira si hay una recurrencia del hematoma evacuado, o si hay otro hematoma en otro lugar

Caso 2 F D 38 años, hombre Admitido al hospital en estupor cinco dias despues de un trauma a la cabeza, sin sintomas neurologicos Operacion el dia de admision al hospital extraccion de un hematoma subdural izquierdo (45 cc) Mejoria gradual post operatoria y 2 semanas mas tarde retorno del estupor, sin sintomas neurologicos 17 dias despues de la primera intervencion una ventriculografia evidencio una masa en la parte posterior de la region parietal en el lado derecho, en el mismo lado de una fractura lineal de la boveda craneana (Fig 2) Se llevo a cabo una craneoplastia con extirpacion de un hematoma epidural (40 Gm) A continuacion sucedio una mejoria rapida y el enfermo salió del hospital sin ninguna secuela

De vez en cuando la razon de que el enfermo empeore se debe a la existencia de un hidrocefalo posttraumatico progresivo Si este proceso no responde a la anatomosis ventrículo cisternal o se detiene espontaneamente, el desenlance final es la muerte del enfermo Un hematoma epidural puede ir acompañado de un hematoma intracerebral o subdural en el mismo lado o en el lado opuesto Por eso esta indicado explorar ambos lados Cuando solo

Fig 2 (Caso 2) Ventriculogramas Vista anteroposterior y lateral derecha mostrando la presencia de una masa en la región parietal posterior derecha De esta región, y a través de un colgajo, se evacuó un hematoma epidural de 40 Gm

se evacua el hematoma epidural y después de una mejoría sucede un empeoramiento o estacionamiento clinicos, la ventriculografía mostrará cuál es la combinación de hematomas, y el tratomiento adecuado a seguir.

Las complicaciones y secuelas post-traumáticas pueden ser un mayor problema de tratamiento que el trauma inicial. Aparte del gran campo de las enfermedades fingidas hay numerosas secuelas verdaderas. La epilepsia se encuentra en el ocho ciento aproximadamente de las heridas de la cabeza en los enfermos civiles. Puede aparecer inmediatamente o de 15 a 20 años más tarde. Una medida. preventiva buena contra las convulsiones imprevistas es la administración rutinaria de medio grano de luminal dos veces al día en todo caso sospechoso de lesión cortical durante seis meses. Todo caso de trauma debe seguirse con electroencefalografía. En ciertos pacientes el tratamiento quirúrgico de la epilepsia es el único eficaz. Las fístulas arteriovenosas, trombosis del seno cavernoso y aneurismas intracraneales pueden encontrarse como resultado de un traumatismo craneal. La angiografía es a veces necesaria para su diagnóstico y localización final.

Las meningitis y los abscesos post-trauméticos con el uso preventivo de los antibióticos han disminuido considerablemente. Un pneumocéfalo y rinorrea de líquido céfaloraquídeo post-traumático pueden precisar una intervención quirúrgica.

Los defectos de la bóveda craneana deben ser reparados dos o tres meses después que la piel ha cicatrizado. Una espera de un año es necesaria después que una infección ha desaparecido. Los mejores métodos craneoplásticos se obtienen usando transplantes de la tibia, placas de tántalo y placas de material plástico. Las placas de tántalo deben fijarse con hilos de metal y no con tornillos. Le ventaja de las resinas acrílicas sobre las de tántalo son obvias, si se han de hacer pneumoencefalografías más tarde (Fig. 3).

Las secuelas de los nervios craneales pueden ser transitorias o permanentes. Los dolores de cabeza post-traumáticos debidos a lesiones vasculares de la piel deben tratarse con infiltración de novocaína, y si recurren, el vaso afectado puede ser parcialmente extirpado. Las cefalalgías causadas por adherencia de la pía pueden ser aliviadas por la encefalografía con aire.

Cambios de personalidad, pérdida de apetito, cansancio desusado y debilidad general acontecen con frecuencia. Problemas de comportamiento y enocionales, deterioración intelectual, pérdida de memoria e inhabilidad para concentrar la atención pueden aparecer por un tiempo o ser permanentes después de un trauma craneal.

En general los estados neuróticos y psicóticos no son raros. Es conveniente antes de ver por última vez al enfermo someterle a un examen neuropsiquiátrico cuidadoso que incluya pruebas psicológicas porque con frecuencia hay anormalidades que pasan desapercibidas en un examen superficial.

Trauma de la Columna Vertebral: Los traumatismos de la medula espinal pueden clasificarse en dos grupos: unos con fractura de la columna vertebral sin lesión de la médula y otros con lesión de la médula. El problema del transporte del enfermo se resuelve tratando primero el shock, si lo hay, y trasladándole con el menor movimiento y cambio posible de la posición en que se encuentra después del accidente. Una vez en lugar adecuado el examen neurológico y rayos X aconsejarán la posición y disposición a seguir en definitivo. Debe anotarse con cuidado cualquier posible nivel de analgesia, si lo hay, la motili-

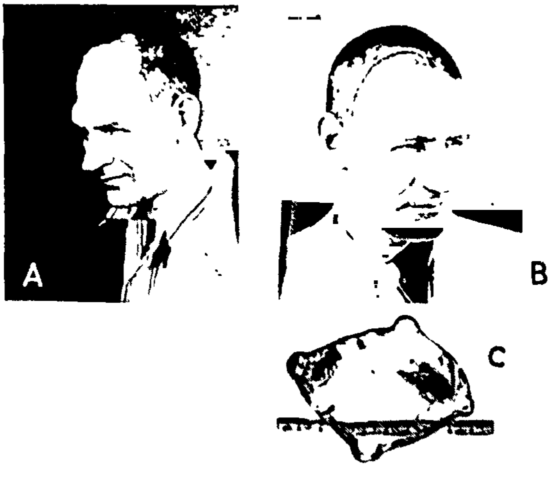


Fig. 3. (Caso 3) M. L. 39 años, hombre. Craneoplastía por medio de una placa acrílica. (A) Antes de la craneoplastía. (B) Cuatro semanas más tarde. (C) Forma y dimensiones de la placa utilizada.

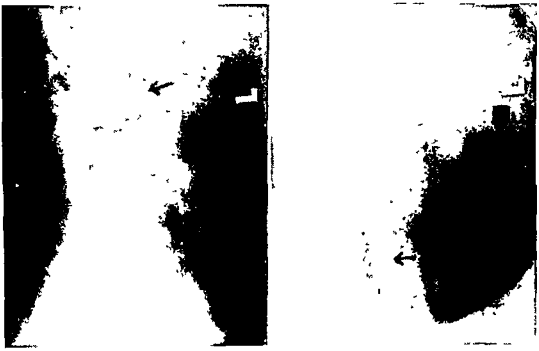


Fig 4. (Caso 4) M. F. 35 años, hembra —A consecuencia de una caída por una escalera sostuvo una fractura comprimida de la segunda vértebra lumbar. (A) No presentó signos neurológicos. Después de un enyesado adecuado (B) la enferma recuperada enteramente salió del hospital a los tres meses

dad de las extremidades y los reflejos Si hay dolor puede utilizarse la morfina a discreción.

Si hay fractura de vértebras, sin lesión de la médula espinal, aparte de la inmovilización puede ser suficiente tratamiento. Hay que prevenir, y debemos criticar, el uso indebido e inadecuado que se hace tantas veces de los enyesados (Fig. 4). Cuando hay una lesión de la espina dorsal, aparte de la inmovilización en hiperextensión, es preciso tener especial cuidado de la micción, defecación y estado de la piel, así como del estado nutritivo general.

En fracturas de la región cervical lo mejor es aplicar tracción ósea. Con este fin es aconsejable utilizar las tenazas de Crutchfield. El uso de laminectomías en los traumas de la columna vertebral no debe ser basado en principios generales, sino que se decide después de un examen y de consideración individual de cada caso. El problema del parapléjico existe con mayor frecuencia durante confllictos militares. Con las experiencias de la última guerra podemos rehabilitar los parapléjicos hasta un grado insospechado hace pocos años.

Hay otro grupo de enfermedades que podemos considerar como debidas a trauma sin fractura de vértebras ni lesión de médula espinal, al cual pertenecen un gran número de "ciáticas" o "lumbagos," producidos por presión en las raíces de un núcleo intervertebral herniado o que protrude. En estos casos, después de tratamiento paliativo, el diagnóstico puede confirmarse por mielografia y luego se procede a la extirpación del "disco" o "discos" afectados.

Caso 5: F. P. 33 años, hombre. Varios meses de "ciática" bilateral.—Signos neurológicos (reflejos y parestesias e hipoestesias) cambiables. La mielografía con pantopac mostró una obstrucción entre la cuarta y quinta vértebra lumbar (Fig. 5). Después de la extracción de un disco intervertebral herniado por aproximación interlaminar unilateral sin laminectomía, el paciente salió del hospital ocho días más tarde sin dolor.

TUMORES DEL CEREBRO

El diagnóstico temprano de los tumores del cerebro es esencial para sacar mayor partido de los resultados más satisfactorios que la técnica neuroquirúrgica nos facilita hoy día. La dilación y errores diagnósticos más frecuentes se deben en general a no utilizar ciertos procedimientos modernos que describiremos brevemente a continuación, y sin cuyo uso las misinterpretaciones pueden ocurrir fácilmente. Por ejemplo, ciertos tumores intracraneales han sido previamente tratados como sinusitis. También hemorrágias en tumores produciendo hemiplegías han sido consideradas como hematomas secundarios a hipertensión. Síntomas producidos por neoplasmas han sido adscritos a arterioesclerosis cerebral. Síndromes de Meniere, hemicraneas, cefalalgias y neuralgías occipitales son producidas a veces por tumores del cerebro. Algunas histerias, neurosis y psiconeurosis tratadas durante largo tiempo con procedimientos psicoterapéuticos, psicoanálisis e incluso choques eléctricos, demonstramos eran producidas por crecimientos tumorales intracraneales. También varios casos de epilepsias idiopáticas de la infancia y adultos eran producidas en realidad por tumores del cerebro. No es raro ver niños previamente considerados hidrocefálicos, o con supuestas meningoencefalitis, hemorragias intracerebrales, "convulsiones asintomáticas" etc. cuyo estado es causado por un tumor cerebral.

Fig. 5. (Caso 5) Myelograma con 3cc. de pantopac. Obstrucción entre la cuarta y quinta vértebra lumbar, producida por un disco intervertebral herniado que fué extirpado por aproximación interlaminar, unilateral Nótese cómo la aguja utilizada para la punción lumbar e introducción del pantopac se deja inserta, para extraer la sustancia opaca, después de la fluroscopia y tomas radiográficas.

No hay que olvidar cómo, en enfermedades congénitas del cerebro o malformaciones de desarrollo, puede presentarse simultáneamente un tumor cuyo diagnóstico permitirá el tratamiento adecuando y el cuidado y atención médicos debidos. Tal ocurre con la esclerosis tuberosa donde la existencia de gliomas no es rara. En un caso nuestro existía un papiloma del plexo coroideo. Estas observaciones sugieren que en casos seleccionados de esclerosis tuberosa está indicado un tratamiento quirúrgico como único procedimiento para aliviar las complicaciones y síntomas resultantes de la presencia simultánea de una formación neoplásica.

Debe llamarse la atención también a la aserción errónea, casi universal, de que los tumores del cerebro no presentan síntomas "del sistema extrapiramidal," es decir, corea, atetosis, rigidez parkinsoniana, etc. Solo en los últimos seis meses hemos tenido ocasión de ver un astrocitoma con coreo-atetosis y un glioblastoma con rigidez parkinsoniana.

Procedimientos diagnósticos

Es esencial el obtener primero una historia clínica detallada, hacer luego un examen físico general y neurológico minucioso y después completar la investigación clínica con radiografías, estudios electroencefalográficos, punción lumbar, aerografía y arteriografía según las indicaciones de cada caso individual. *Rayos X*—Las radiografías deben incluir siempre tomas estereoscópicas del cráneo. A veces pueden demostrarse erosiones cerca o en el lugar del tumor. Otras veces la frecuencia de crecimientos anormales del hueso, huellas vasculares anormales, deformidades del cráneo, decalcificaciones o depósitos de material radio-opaco como calcio nos pondrá en la pista de un diagnóstico apropiado.

Caso 6: G. B. 53 años, hembra. Historia y examen clínico indicativo de un adenoma de la pituitaria. La radiografía mostró una erosión marcada de la silla turca. A los nueve días de extirpar el tumor la enferma pudo regresar a su casa con la visión considerablemente mejorada (Fig. 6, izquierda).

Caso 7: M. L. 39 años, hembra. Historia de un ataque epiléptico grande (grand mal), controlado fácilmente con sedantes. La radiografía sugirió la presencia de un quiste dermoide con invasión del nóstico fué confirmado al extirpar un quiste dermoide epidural y el hueso frontal afectado. Días más tarde se hizo una erneoplastía con resina acrilica (Fig. 3). Durante cuatro años no habido retorno de la epilepsia ni secuela alguna postoperatoria.

Electroencefalografía: Es la técnica de registrar la actividad eléctrica del cerebro hu-

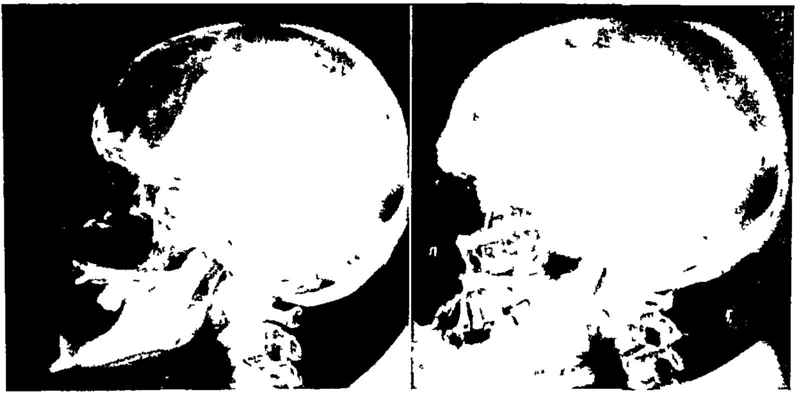
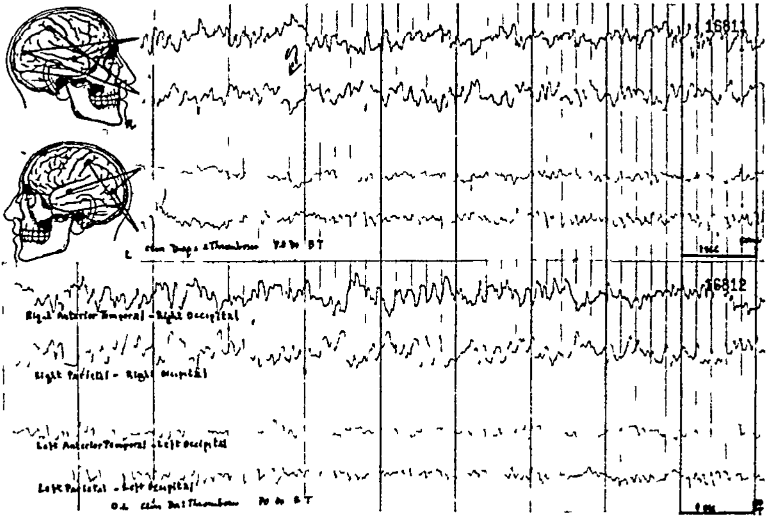


Fig 6 Izquierda *(Caso 6)* Erosión marcada de la silla turca en un caso de tumor de la glándula pituitaria Derecho *(Caso 7)* Lesión ósea de hueso frontal derecho debida a la presencia de un quiste dermoide epidural


16811
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Right Anterior Temporal - Right Occipital
Right Parietal - Right Occipital
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Left Parietal - Left Occipital
B T
B T

Fig 7 *(Caso 8)* Electroencefalograma en un glioblastoma de la región temporal posterior previamente diagnosticado como trombosis La flecha señala una de las fases mano directamente a través del cuero cabelludo. Así se localizan anormalidades eléctricas producidas por tumores. Es también un procedimiento necesario para el diagnóstico, pronóstico, indicaciones terapéuticas y determinación del curso clínico de las epilepsias, traumatismos cerebrales y lesiones vasculares intracerebrales. Aunque la técnica es complicada, no produce la menor molestia al enfermo y al presente su uso se va generalizando rápidamente.

Caso 8: L. H. 55 años, hembra. Caso diagnosticado previamente como trombosis del hemisferio derecho. El examen electroencefalográfico nos hizo sospechar la presencia de un tumor (Fig. 7). Nótese la desorganización de la actividad eléctrica del lado derecho comparada con el izquierdo, la presencia de fases invertidas y las ondas de mayor amplitud y menor frecuencia que lo normal. La localización electroencefalográfica fué confirmada por la aerografía y veinte días después de extirpar un glioblastoma de la región parietal posterior derecha, la enferma salió del hospital en buen estado general sin secuelas que produjeran invalidez.

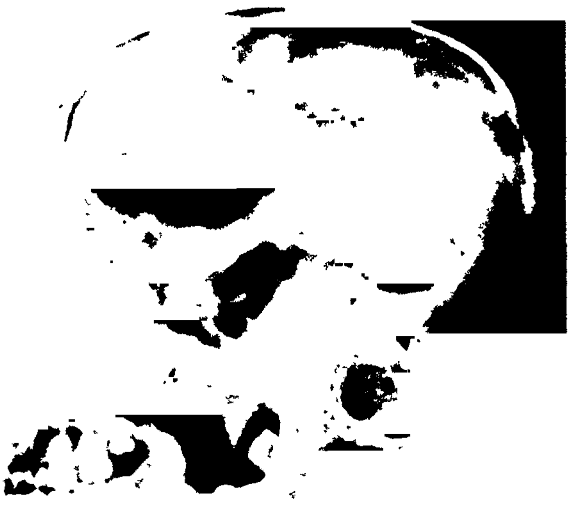

Fig. 9. (Caso 10) Ventriculogram mostrando una masa en la región posterior del tercer ventrículo producida por un pinealoma.

Fig. 8. (Caso 9) Angiograma cerebral izquierdo. Procedimiento directo, previa exposición de la carótica. Nótese el separador, jeringuilla y aguja en posición. Demostración de un hemangioma de la región parietal posterior izquierda.

Un cierto número de enfermos con síntomas neurológicos clínicos tienen electroencefalogramas normales. En los últimos años se han usado varios procedimientos para demostrar las anormalidades eléctricas latentes o subclínicas no demostrables por los métodos usuales. Con este fin la hiperventilación es usada corrientemente por casi todos los electroencefalógrafistas. El método del metrazol de Walker, el del sueño de Gibbs, la lobelina de Buynard e inhalaciones de CO_2 ú O_2 de Bauduin entre otros, son los más conocidos. Siempre que es posible debe usarse la pneumoelectroencefalografía, es decir, la electroencefalografía simultánea con la pneumoencefalografía. De esta forma hemos conseguido diagnósticos no logrados con otros métodos (Fig. 12).

Con relación a la *punción lumbar* mencionaremos únicamente la frecuencia con que los datos obtenidos son causa de error por parte de quienes ponen una fé indebida o exculsiva en éste procedimiento.

La aerografía cerebral permite la visualización radiográfica de los ventrículos y espacio subaracnoideos, sustituyendo el líquido céfalorraquídeo por aire. Si la presió del líquido céfalorraquídeo es normal, y no hay papiledema, ni se sospecha una lesión de fosa posterior la aerografía cerebral se hace por vía lumbar (pnueumoencefalografía) Entonces el enfermo se sienta y a través de una punción lumbar se reemplaza fraccionadamente de diez en-diez cc, el líquido céfalorraquídeo por aire Es conveniente tomar una radiografía preliminar antes de terminar Con frecuencia se utiliza la anestesia con pentotal sódico en lugar de la local, para mayor comodidad del enfermo Cuando el líquido céfalorraquídeo tiene una presion elevada, si hay edema papilar o se sospecha una lesión de fosa posterior la sustitución de líquido por aire se hace a través de una aguja introducida en los ventrículos por una perforación previa del cráneo (ventriculografía) Mientras la ventriculografía permite una visualización más detallada del sistema ventricular la pneumoencefalografía demuestra, además, los espacios cisternales y subaracnoideos

La Angiografía Cerebral Consiste en la visualización radiográfica del sistema vascular cerebral por medio de la introducción en la circulación sanguínea del cerebro de una sustancia opaca a los rayos X Es útil especialmente en la localización y estudio de los tumores vasculares La sustancia opaca a los rayos X utilizada hoy día, en general, es el Diodrast en solución al 35 percent La inyección se hace a través de una aguja introducida en la carótida común, la carótida interna o en la arteria vertebral La inserción de la aguja se hace por visión directa previa incisión de la piel y exposición del vaso, o por inyección percutánea directa sin previa incisión de la piel Usamos con preferencia el procedimiento percutaneo La toma de radiografias se hace simultáneamente y en sincronización con la inyección Hay innumerables métodos y sistemas para cambiar las placas con rapidez La estabilización y simplificacion de ésta técnica se logrará cuando podamos filmar en el futuro inmediato el paso del Diodrast por la circulación del cerebro

Caso 9 A K, 52 años, hembra Estupor y coma subditos seguido de cuadriplegia y hemorragia subaracnoidea En cuatro semanas recuperacion casi total con hemianopia homónima derecha Angiografia cerebral de la carótida izquierda, por el método directo previa exposicion de la carótida en el cuello, mostró un hemangioma de la región parieto occipital izquierda (Fig 8). A continuación se ligó la carótida común Una semana más tarde la enferma salió del hospital sin ninguna secuela, excepto una hemianopia parcial Durante dos años ha podido llevar una vida normal sin restricciones ni impedimento físcio alguno

*Tratamiento:*Una vez establecido el diagnostico y localización del tumor del cerebro se procede a su extirpación quirúrgica, puesto ques éste es el único tratamiento racional hoy dia El campo de la neurocirugía para neoplasmas cerebrales ha hecho grandes progresos en los últimos años Los adelantos en la anestesia son un factor considerable en los mejores resultados obtenidos En general usamos la anestesia intratraqueal de éter También es ya aceptado que las craneotomías amplias permiten un campo operatorio mas adecuado para exponer el tumor y proceder a una extirpación completa

Caso 10 L S, 13 años, hombre Sospechamos la presencia de un pinealoma al descubrir paresis bilateral del movimiento ocular hacia arriba La ventriculografía confirmo el diagnostico (Fig 9) La extirpación del tumor se hizo a traves de una craneoplastía coronal posterior (Fig 10A, B) A las 3 semanas salió del hospital Durante los últimos dos años realiza su vida deportiva normal y ocupa siempre uno de los primeros puestos de su clase en la escuela Actualmente sigue, aunque disminuída, la paresis ocular preoperatoria

Progresos constantes en instrumental quirúrgico simplifican y mejoran las técnicas operatorias Hemostasis con nuevos métodos (fibrina gasa absorbente, etc) ha resultado en considerable brevedad del tiempo operatorio, con gran disminución del "shock" del enfermo Los procedimientos modernos de transfusión de sangre, la administración intravenosa de líquido y la alimentación del enfermo inconsciente a través de tubos nasales y duodenales han resuelto el problema hasta entonces insoluble, de alimentación, de preparación preoperatoria y de cuidado post operatorio del enfermo

Las complicaciones serias y graves por infecciones, ha quedado grandemente disminuído con el uso de drogas antibióticas y de derivados sulfamídicos En conclusión, como en cualquier otra parte del cuerpo, la importancia del diagnóstico temprano del tumor del cerebro dara al enfermo mas oportunidad para su mejoría y recuperación postoperatoria

Conseguiremos mayor eficacia en los pro

blemas de tumores cerebrales difundiendo los conocimientos modernos a la profesión médica no especialista y al público en general. Al público debemos indicar lo que puede ofrecer la Neurología y Neurocirugía modernas y a los médicos no especialistas deben presentárseles con más detalle las técnicas y procedimientos diagnósticos y terapéuticos. El enfermo con un tumor cerebral tiene hoy día mayor posibilidad de curación que antes y a medida que el tiempo pasa y el progreso continúa son de esperar mejores resultados. Actualmente la mortalidad quirúrgica en tumores del cerebro es comparable a la de cualquier operación semejante en otra parte del cuerpo, si ha habido un diagnóstico temprano razonable y adecuada técnica quirúrgica.

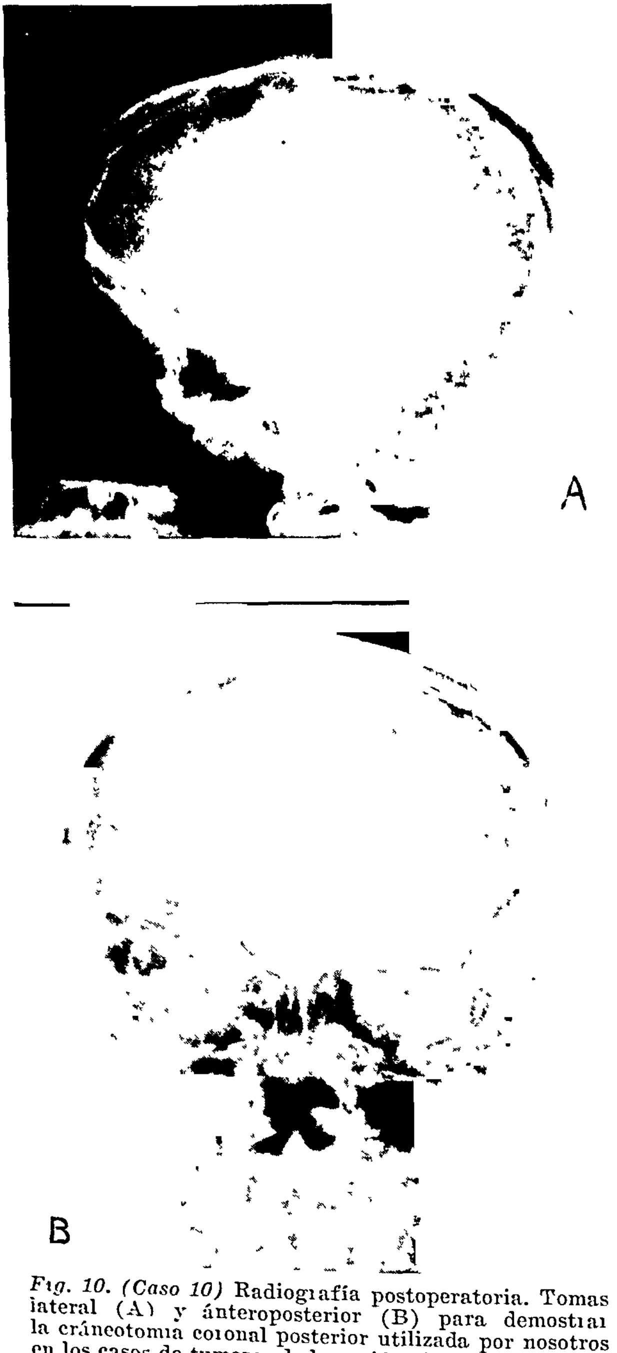

Fig. 10. (Caso 10) Radiografía postoperatoria. Tomas lateral (A) y ánteroposterior (B) para demostrar la cráneotomía coronal posterior utilizada por nosotros en los casos de tumores de la región pineal que precisan extirpación quirúrgica.

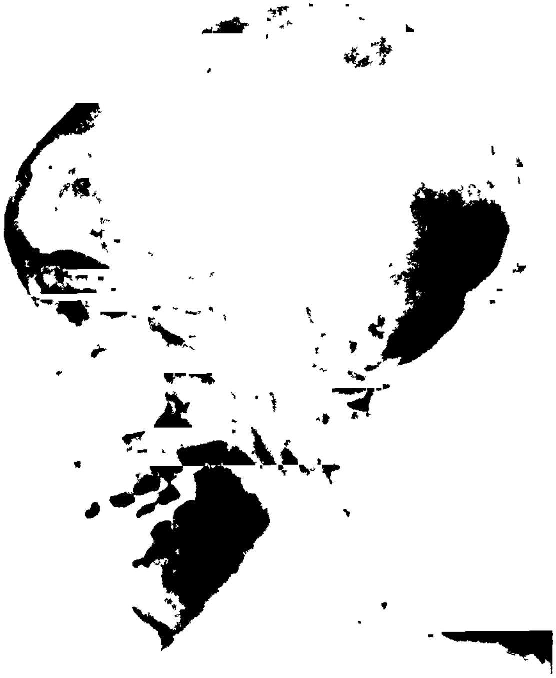

Fig. 11. (Caso 11) Angiografía cerebral izquierda. Demostración de un aneurisma intracerebral.

TUMORES DE LA MÉDULA ESPINAL

En general, el examen nuerológico es suficiente para llegar al diagnóstico final. Si es preciso podemos recoger más información por una punción lumbar con precauciones debidas. Las radiografías y en ciertos casos una mielografía serán necesarios para el diagnóstico preoperatorio definitivo. La técnica quirúrgica en tumores de la médula espinal es, salvo en detalles, semejante a la de hace 20 años.

Un tumor de la médula pueden ser una manifestación tumoral del resto del organismo

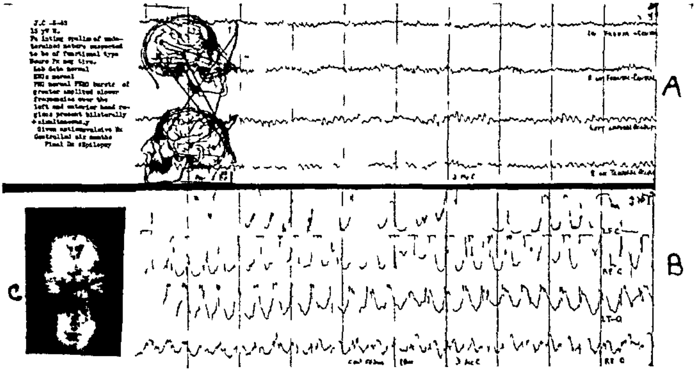

Fig 12 (Caso 12) Pneumo electroencefalografía en un enfermo cuyo previo EEG (A) era normal después de un pneumoencefalograma normal con 50 cc de aire (C) se obtuvo un EEG definitivamente anormal sugeridor de un estado de epilepsia

como es en la neurofibromatosis múltiple de Recklinghausen En estos casos su extirpación quirúrgica puede retrasar por varios años o evitar, durante la vida del enfermo, la presencia de una paraplegia o cuadriplegia cuando los crecimientos neurofibromatosos comprimen la medula en uno o varios niveles

TRATAMIENTO QUIRÚRGICO DEL DOLOR

Cuando el dolor no responde a la terapéutica médica, su alivio depende de la interrupcion quirúrgica adecuada, de las vías nerviosas que transmiten o influencian la sensación de dolor

El tratamiento quirúrgico del dolor se realiza, casi exclusivamente, en las enfermedades cronicas o en casos cuya patologia etiológica es incurable Las medidas conservadoras como opiaceos, no deben utilizarse prolongadamente, por temor a añadir un problema mas a los ya existentes En general, si se calcula que el paciente ha de vivir mas de cuatro meses se debe recurrir a una terapéutica quirurgica La eleccion de la técnica operatoria se basa en el conocimiento neurofisiológico de las vias nerviosas transmisoras del dolor En la cabeza y cuello las sensaciones dolorosas son llevadas esencialmente a través de los nervios trigémino, glosofaríngeo y los primeros pares cervicales En el resto del cuerpo a través de los nervios espinales

En los nervios periféricos las fibras que conducen todas las sensaciones y las fibras motrices van mezcladas en haces mixtos Al entrar el sistema nervioso central por las raices posteriores, las fibras transmisoras del dolor y temperatura se separan de las conductoras de otras sensaciones y de las motrices para anastomosarse con las celulas de segundo orden, cuyas prolongaciones ascienden por el fasciculo espinotálamico del lado opuesto al talamo y de aquí, después de sinapsis con las células de tercer orden, van a la corteza La integracion funcional y psíquica del dolor parece tener lugar en el lóbulo frontal y quizá también en parte, en el talamo El lugar de interrupción de las vias del dolor se hace segun la extensión y situación del dolor El dolor de la cabeza y cuello desaparecen con mas eficacia después de la seccion de los nervios glosofaringeo y trigémino y rizotomia posterior de los primeros pares cervicales

Para el dolor localizado en el cuerpo desde la línea mamilar hacia abajo se debe llevar a cabo una tractotomía espinotalamica Este procedimiento consiste en la sección de las vías del dolor en la médula espinal sin envolver las vias motrices y del tacto Cuando el dolor

y (c) estados obsesivo compulsivos Es por lo tanto condición primordial hacer un diagnóstico psiquiátrico exacto Después se procede al tratamiento médico y según el caso requiera, se usarán procedimientos psicoanalíticos, psicoterapia, choque eléctricos, choque insulínicos y combinación simultanea de choques eléctricos y de insulina Cuando el tratamiento médico falla recurrimos a la psicocirugía

El periodo de tratamiento puramente psiquiátrico antes de decidir sobre una operación varía segun el enfermo En general, casos tempranos de esquizofrenia, sin curación o mejoria parcial después de seis meses de tratamento clinico intensivo, deben considerarse candidatos para cirugía

Resultados Los resultados post operatorios pueden ser increibles por dramaticos e impresionantes Enfermos recluídos meses y años en instituciones y clínicas mentales, con un grado extremo de tension y agitación, que pasean constantemente por la sala y corredores, llorando, quejandose y retorciéndose las manos en agonía emocional pueden ser capaces de trabajar y valerse a sí mismos después de una operación del cerebro Con frecuencia vemos esquizofrénicos recluídos en celdas por su agresividad contra cualquier persona que se le acerque, que rehusan vestirse, orinan y defecan en los rincones, y que [si] se les da una silla o mesa la deshacen en pedazos Viven en situación peor que animales La psicocirugía los mejora a menudo, les permite una vida colectiva con otros enfermos y son con frecuencia devueltos al seno familiar Con tales resultados en casos tan poco favorables, las posibilidades de curación en otros enfermos menos deteriorados mentalmente son mucho mayores

En general, la terapeutica quirurgica, debe ser suplementada con tratamiento psiquiátrico, al cual son susceptibles muchos enfermos que previamente eran inaccesibles Si bien los progresos en éste campo de la ciencia son considerables en los últimos años, nuevos adelantos y observaciones mejoran constantemente los resultados obtenidos en el pasado immediato Para acelerar éste progreso, el neurocirujano debe conocer además de las técnicas de psicocirugía el valor de la psiquiatria y estar familiarizado con los adelantos en anatomía y fisiología del sistema nervioso Cuando se reunen los esfuerzos de científicos de cada especialidad se tiene una situació ideal para incrementar con mayor rapidez nuestros conocimientos

Relacion de la Neurocirugia con Otras Especialidades Medicas Aparte de la relación con otras especialidades que se desprende de los parrafos que preceden, la neurocirugía tiene contacto casi constante con otros campos de la Medicina

Hipertension Las simpatectomías toracolumbares para combatir la hipertension se utilizan siempre que otros metodos conservadores no dan una respuesta satisfactoria Antes de llevar a cabo la simpatectomia debe estudiarse cada caso detalladamente para conocer el estado de funcionamiento renal y cardíaco principalmente No es posible generalizar sobre las indicaciones y contraindicaciones Hemos visto enfermos en coma y en uremia, con descompensación aguda cardiaca y edema papilar con hemorragias como resultado de una encefalopatía hipertensiva, a quiénes después de no haber respondido a ninguno de los tratamientos clínicos se les extirpó la cadena simpática toracolumbar y los nervios esplénicos Después de la operacion tuvieron una mejoría progresiva lenta y han subsistido hasta ahora tres años de vida ambulatoria pudiendo realizar trabajos sedentarios y viajar largas distancias en varias ocasiones En otros casos hay una desaparición post operatoria de síntomas subjectivos cefalea, mareo, etc aunque la presion arterial permanezca elevada La mortalidad operatoria es mínima, en algunas series de uno al dos por ciento En vista de lo expesto es logico ser precavido en determinar las contraindicaciones Podemos decir desde el punto de vista practico para el enfermo y sus familiares y para darles una idea de cuanto podemos ofrecerles (1) en el peor de los casos no sufriran ningún cambio, es decir ni empeoraran ni mejoraran, (2) del 70 al 80 percent tienen una mejoría variable que va de la desaparición postoperatoria de sintomas subjectivos sin cambio de la presión arterial o con su descenso mas o menos transitorio, hasta rehabilitación completa del enfermo con retorno de la presion a limites normales, por un periodo de tiempo (años a veces) no predecible

Enfermedades Infecciosas del Sistema Ne

podremos lograr un progreso constante, estando asi en condiciones más ventajosas para ofrecer un numero creciente de mejorias y curaciones a quienes necesiten nuestra ayuda

SUMMARY

The author presents a comprehensive study of modern surgery of the nervous system, liberally implemented with illustrative case reports He discusses traumatic lesions of the nervous system, tumors of the cerebrum and tumors of the dorsal portion of the spine, with comments on suitable diagnostic procedures, especially encephalographic study He examines the potentialities of surgical treatment of pain referable to the nervous system and unresponsive to medical therapy, and adds a section dealing with psychosurgical considerations Epilepsy, hypertension and cerebral vascular lesions are discussed

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Seventh International Assembly, Buenos Aires, Argentina, August 1950

Fifteenth Annual Assembly, United States Chapter, Cleveland, Ohio, October 31 November 3 inclusive, 1950

Sixteenth Annual Assembly, United States Chapter, Chicago, September 11 14 inclusive, 1951

Seventeenth Annual Assembly, United States Chapter, San Francisco, California, October 28 31 inclusive, 1952

Second Annual Assembly, Italian Chapter, Venice, Italy, May 27 29 inclusive, 1950

Second Annual Assembly, Indian Chapter, Bombay, India, April 22 24 inclusive, 1950

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Secretary

International College of Surgeons
1516 Lake Shore Drive
Chicago 10, Illinois

trales de Enfermeras, y que se cambiarían por equipos nuevos y estériles por el sistema de canje, debido a que la política de economías seguida por las autoridades del I. M. S. S. no lo permitió.

De haberse logrado, habríamos llegado al desideratum moderno en el funcionamiento de esas Centrales y las enfermeras habrían ahorrádose gran cantidad de tiempo, el manejo de la técnica aséptica hubiese sido casi integral y toda la preparación de equipo de curación y materiales se habriá concentrado a las Centrales respectivos.

Previa "Solicitud de Operación" autorizada por la firma de la paciente o en su caso por algún familiar responsable, ingresaron las enfermas al Quirófano y por ese simple y solo hecho, la paciente quedó bajo la atención del Jefe y personal del mismo y bajo el cuidado del Servicio de Anestesiología.

El Médico Obstetra y sus Ayudantes, a partir de ese momento, sólo procedieron a la esterilización de sus manos y a la práctica de la intervención toco-quirúrgica o quirúrgica propuesta.

Todas las ordenes al personal de Enfermeras y en relación con la preparación de la paciente, la selección y aplicación de la medicación preanestésica, del método analgésico o anestésico, así como los cuidados del postoperatorio inmediato, quedaron de la responsabilidad exclusiva del Jefe del Quirófano y del Servicio de Anestesiología.

La enferma recibida fué sometida a una exploración preoperatoria mínima, pero necesaria, completada con los datos de la carta clinica y la información personal del Obstetra, para establecer el "riesgo anestésico" y determinar el tipo de medicación pre-anestésica y el procedimiento analgésico o anestésico que habría de recibir.

Queremos explicar que en el caso de la enferma obstétrica, la tensión arterial debe ser registrada entre las contracciones uterinas y de modo repetido, antes de asegurarse acerca de las cifras.

En general debe concluirse que la estimulación emocional y simpato-adrenal la mantiene en lo posible y, hasta que fallan los mecanismos compensadores, dentro de límites aparentemente buenos, en muchos casos. Pero no hay que confiar demasiado en esas "buenas tensiones," que caen precipitosamente al entrar la paciente en anestesia quirúrgica o al actuar la raquianalgesia sobre gran parte del sistema simpático.

Se hizo, pues, una búsqueda repetida de las cifras tensionales, de la frecuencia y caracteres del pulso materno y fetal, para determinar junto con la exploración general, los antecedentes del trabajo de parto, de la pérdida sanguínea y otros, si la enferma se hallaba en buenas condiciones o si habiendo shock obstétrico o hemorrágico tenía éste caracteres leves, serios o graves para la vida de la madre y del producto.

La exploración acerca del estado del feto fué preocupación muy especial nuestra, por la búsqueda reiterada del foco de auscultación y las características de frecuencia, amplitud y ritmo de los latidos del producto.

Por último realizamos una inquisitiva constante acerca de los antecedentes del último alimento tomado por la paciente y de la abundancia de éste, con vista a la inminente presencia de vómito durante la inducción a mantenimiento de cualquier procedimiento de anestesia por inhalación.

La enferma fué dotada de ropa limpia, se le sujetó el cabello con una compressa de manta de cielo haciendo un turbante, se le colocó en la mesa y se le instaló una venoclisis siempre con aguja del número 18 (calibre suficientemente grueso) para aportarle flúidos y electrolitos, plasma o sangre total en su caso.

La posición inicial en la mesa de operaciones varió según el tipo de analgesia o anestesia a instituir. En las intervenciones tocoquirúrgicas no se dío posición ginecológica sino hasta después de establecida aquella, contra la costrumbre muy arraigada de dar la posición primero, ya que estando la paciente con las piernas levantadas la inducción de la anestesia por inhalación se hace más larga, el gasto de anestésico es más considerable y facilmente, si hay período de excitación, la mujer cambia de postura, todo ello como causa de que la dinámica circulatoria se trastorna y la narcosis no no puede tomar su ritmo normal y progresivo.

Sólo hubo una excepción: el de los casos en que se aplicó anestesia intravenosa, pues en estos sí se la colocó en posición, se hizo la antisepsia del campo, se le sondeó y posteriormente se principió la inducción, con el propósito de ahorrar anestéstico y por las facilidades de rapidez y ausencia de período de excitatión que provee la anestesia por barbituratos intravenosos.

En ningún caso se procedió a la preparación del campo sino hasta que el Anestesiólogo así lo indicó y ya que la enferma estuvo en plano quirúrgico de analgesia o anestesia. Insistimos en que así fuera, pues es frecuente que el Cirujano o Ayudantes no esperen a que el Anestesista indique el momento de principiar, cosa que entraña graves inconvenientes y peligros, pues la enferma se excita y se mueve, forcejea o grita, entorpeciendo la marcha de la indución, además de que, por la propia excitación nerviosa, el reflejo vasopresor que se inicia en la piel al contacto de las soluciones frías con que se hace la antisepsia y el dolor que origina la iniciación prematura de la operación, puede desencadenarse un accidente mortal de fibrilación ventricular, sobre todo cuando se usan anestésicos como el cloroformo cateterismo fué aséptica y no usamos sonda metálica cuando la enferma estaba en trabajo de parto, por temor a traumatizar la uretra.

El sondeo fué rutinario antes de toda operación quirúrgica o tocoquirúrgica, pues la muy extendida costumbre de no evacuar la vejiga puede originar que el órgano interfiera en el campo operatorio, aparte de que es frecuente la paresia y aun la paralisis vesical, después de las intervenciones pélvicas o del vientre, a lo que se añade la profusa formación de orina que sigue a la administración de flúidos intravenosos, sobre todo de soluciones glucosadas, aunándose todo esto para producir una distensión que es sumamente molesta en el postoperatorio.

Al terminar el acto quirúrgico, la paciente permaneció en la Sala de Operaciones hasta que el recobro de la anestesia y del shock fueron suficientemente grandes.

Las normas de anestesiología instituídas tuvieron por objeto hacer de la conciencia y aceptación de las médicos, que las modernas atribuciones de ese Servicio incluyen no sólo la intervención del especialista en la administración de los analgésicos o anestésicos en sí, sino la participación en ciertos aspectos del preoperatorio y que son de su responsabilidad exclusiva la selección y aplicación de la medicación pre-anestésica, la selección y aplicación del procedimiento analgésico o anestésico, la atención de los enfermos durante el acto quirúrgico sobre todo en lo que concierne a la prevención y tratamiento del shock secundario o hemorrágico, el mantenimiento del equilibrio flúideo y electrolítico y en general todo aquello que se relaciona con el enfermo que no es la intervención quirúrgica en sí.

Varios puntos fueron insistentemente sostenidos aún en contra de opiniones generalmente aceptadas por los Obstetras. Por ejemplo, se solicitó la suspensión de la alimentación la administración racional de líquidos, en su caso, en las enfermas en quienes era de esperarse la evolución de un parto distócico o patológico, substituyéndose esa ingestión por la administración racional de líquidos glucosa y vitaminas por la vía parenteral, fundados en que un estómago ocupado constituye una seria amenaza para la vida, por el ligro potencial de una aspiración de con- ido gástrico hacia las vías aéreas durante la inducción o mantenimiento de la anestesia por inhalación

Otro punto fué el de la necesidad de controlar lo más prolijamente posible el estado general de la madre y del producto durante el trabajo de parto, sobre todo por lo que respecta a la aparicion de signos de shock obstétrico o hemorrágico, o de sufrimiento fetal sostenido, por la constante búsqueda de las cifras de la tensión arterial, caracteres del pulso materno y signos como palidez, sudación, enfriamiento, excitación nerviosa, etc, y el estado de los latidos fetales, aconsejandose la terminación del parto quirúrgicamente, si la tensión arterial máxima descendía a 100 mms de mercurio o menos (sobre todo si la tensión diferencial o presión del pulso era poco amplia) pues en efecto, podemos afirmar, que cuando la madre entra en estado de shock y sobre todo si la hipotensión toma caracteres francos de declinación, el sufrimiento del producto se hace máximo y sus posibilidades de vida son mínimas

Un descenso sostenido de las cifras tensionales a 85 u 80 mms para la presión sistólica o menos, casi irremediablemente produce la muerte del feto por anoxemia, pues la disminución del volumen activo circulatorio en presencia de esa tensión es de no menos del 25 por ciento

También insistimos en la prevencion y tratamiento de los síndromes de deshidratacion desde lo iniciación del trabajo de parto, bajo las siguientes bases

El suero clorurado fisiológico, en casos de vómitos o sudación abundantes o para restituir momentáneamente volumen sanguíneo en casos de hemorragia, o también en el postoperatorio para mantener el equilibrio clorurado, dosificándosele en los casos simples a un litro en 24 horas, seguido de otras soluciones cristaloides

El suero glucosado al 5% se usó para aportar agua y glucosa en el pre y post operatorio, sobre todo en los partos prolongados, con el objeto de proveer no solo el flúido necesario, sino glucosa para los requerimientos calóricos y facilitar el almacenamiento de glucógeno en el hígado y músculo uterino, que se agota rápidamente por efecto del ayuno y del trabajo de parto difícil La dosis dependió de la aparición de una franca diuresis y de una colección de orina de no menos de 1000 c c en las 24 horas En los casos no complicados basta con 2000 a 3000 c c en las 24 horas

El mismo suero glucosado, pero al 10% ó al 20% se usó preferentemente como diurético en cantidad de 500 a 1000 cc una o dos veces al día La glucosa hipertónica al 50% y otros glucosidos como sorbitol, etc, los usamos de preferencia para disminuir el edema cerebral o de otros órganos y para disminuir la tensión del líquido cefaloraquídeo

El suero Ringer con lactato de sodio (1000 a 2000 c c) fué preferido para los casos de acidosis postoperatoria, complementado con glucosado al 5%.

El plasma humano desecado y restituído lo usamos pocas veces en el tratamiento de estados graves de shock obstétrico o secundario seguido de transfusion de sangre total, en atención a su alto costo Como plasma concentrado a 3 ó 4 veces, lo aplicamos en casos de toxemias graves o pre eclampsia, para reducir los edemas, evitar la plasmaféresis y aportar proteínas sanguíneas sobre todo la fracción albumina de que tan urgidas se encuentran estas enfermas *

La sangre total durante el preoperatorio, el acto quirúrgico y después de el, fué usada profusamente Creemos sinceramente que en pocos centros quirúrgicos de la Republica se ha recurrido a la transfusión sanguínea en la extensión en que nosotros lo hicimos en nuestro Hospital

Las enfermas en estado de anemia aguda o subaguda por hemorragias profusas o frecuentemente repetidas, recibieron lo cantidad suficiente de sangre para poner su cuenta roja y la cantidad de gramos de hemoglobina, así como le tensión arterial y estado general dentro de límites que permitieron la realización de intervenciones muchas veces graves Las de hemorragia interna por embarazo extrauterino roto o con placenta previa y sangrando, no fueron operadas sin una transfusión previa que mejorara sus condiciones

Tuvimos casos de placenta previa que requirieron hasta 2500 c c de sangre transfundida en el preoperatorio y durante la intervención

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*Hoy contamos con la albúmina de suero humano que introducida a la circulación atrae liquidos intersticiales a la circulación y se prescribe para el tratamiento del shock sin hemorragia los edemas de las toxemias gravídicas y las nefrosis

Las de aborto incompleto recibieron no menos de 300 c c. durante la operación, y los hubo frecuentes en que se administró hasta 1500 c c.

Las operaciones cesáreas se relizaron con 300 c c. ó más durante el acto quirúrgico.

No seguimos el procedimiento equivocado de mezclar la sangre con suero fisiológico o glucosado, porque de ese modo se desvirtúa la transfusión, pues el plasma se diluye y las proteínas sanguíneas se dispersan hasta niveles críticos, haciendo que aquel pierda su poder oncótico y sea arrastrado por plasmaféresis hacia el seno de los tejidos, agravándose el estado de shock.

La política fué la de restituir exactamente los flúidos perdidos: sangre con sangre total; plasma y proteínas sanguíneas con plasma restituído simple o concentrado; agua con soluciones de glucosa al 5%; cloruros con suero fisiológico, de Ringer o suero clorurado hipertónico.

En general las soluciones cristaloides fueron administradas en venoclisis a la velocidad de 45 a 60 gotas por minuto, dosificadas y controladas por la cantidad de orina eliminada en las 24 horas, y por la de cloruros excretados, tratándo de mantener aquella a un volumen no menor de 1200 c c por día y estos entre 4 y 8 gms. en el propio lapso de tiempo. Tomando en consideración los modernos conceptos acerca de la isoinmunización, el futuro obstétrico de la mujer puede quedar gravemente comprometido.

Por último, recomendamos la preparación de la sangre con solución A-C-D, que permite una conservación hasta de 21 días, pues la citratación por el procedimiento común y corriente sólo da un margen de utilidad de 5 a 7 días y la fragilidad globular se acentúa, por o que es fácil que al ocupar solo una parte de la sangre contenida en el frasco, el resto sufra una ligera hemolisis que la hace impropia para usarse posteriormente.

Las reacciones de tipo pirógeno fueron mínimas, y no tuvimos reacciones hemolíticas francas por incompatibilidad de grupo o factor Rh.

Todas las transfusiones se hicieron por el procedimiento de venoclisis, porque creemos que el método de la jeringa entraña peligros como el de la inducción del edema pulmonar, sobre todo si hay estado de shock.

La medicación pre-anestésica más usada en las enfermas en trabajo de parto fué la asociación demerol-atropina o demerol-escopolamina en dosis de 50 a 100 mgs. para el primero y de un cuarto a medio miligramo para las segundas.

En muchos casos, la aplicación fué por la vía intravenosa en atención a la urgencia de realizar el parto. En los quirúrgicos (sin embarazo), fué de un barbiturato 3 horas antes y morfina-esco polamina o Pantopón-atropina en inyección intramuscular 1 hora antes de la operación.

Todas la mujeres en trabajo de parto ingresadas, recibieron oxígeno en circuito cerrado, para mejorar de inmediato las condiciones del feto.

La selección del método analgésico a anestésico dependió fundamentalmente del estado de la paciente, de la operación propuesta, del estado del producto y de la presencia o ausencia de signos de shock obstétrico, secundario o hemorrágico

En lo general dividimos a nuestras enfermas en hipotensas, las que tenían uno tensión sistólica de 100 mm. o menos; aquellas en estado de tensión arterial límite cuya máxima es hasta de 120 mm y por último aquellas cuyas cifras eran de 120 a 140 mm., que se consideraron buenas tensiones. Las enfermas hipertensas, sobre todo como consecuencia de toxemias gravídicas o preeclampsia, pudieron colocarse dentro de límites convenientes, por la administración de acetilcolina intramuscular o intravenosa a dosis moderada.

Las hipotensas, las gravemente infectadas o anemiadas por pérdidas sanguíneas o debilitadas por otras causas, no recibieron anestesia intravenosa ni raquianalgesia clásica o fraccionada

Las pacientes con tensión máxima límite hasta de 100 mm que requirieron aplicación de forceps, recibieron raquianalgesia selectiva de "bloqueo en silla" de Adriani, en atención a que ella es de verdadera elección para esos casos y a que la cantidad de analgésico usado (0 03 a 0.05 gms. de novocaína), casi no influye sobre el sistema simpático. Las francamente hipotensas se anestesiaron por métodos inhalatorios. balsoformo, éter-oxígeno, ó ciclopropano éter-oxígeno, etc

Las versiones internas con gran extracción podálica se efectuaron con éter, balsoformo ó ciclopropano-éter-oxígeno, para proveer adecuada relajación del útero. No se usó raquia selectiva porque la consideramos contraindicada, ya que sólo actúa sobre el segmento inferior, dejando intacto el cuerpo uterino, cosa que puede favorecer la ruptura de la matriz durante la maniobra.

En los legrados digitales o instrumentales recurrimos a anestesia inhalada de ciclopropano-éter-oxígeno, cuando las pacientes eran hipotensas o se encontraban en malas condiciones.

Si el riesgo era "bueno" o "mediano" se hicieron con anestesia intravenosa de pentotal sódico en solución al 2.5%. Algunos fueron hechos con raquianalgesia selectiva de Adriani, empleando de 0 03 a 0.05 gms. de novocaína; y como ésta analgesia no actuá sobre el fondo del útero, se administró una mezcla inhalada de óxido nitroso-oxígeno al 50% para complementar la analgesia. No se usó raquia clásica para éste tipo de intervenciones.

Las colpo-perineorrafias se hicieron de preferencia por el método de "bloqueo en silla," con exclusión de las enfermas francamente hipotensas (con 95 mm. de tensión sistólica o menos) o en precarias condiciones generales o muy infectadas, las cuales se sometieron a procedimientos inhalatorios.

Las laparotomías por embarazo extrauterino roto o por placenta previa que habían sangrado más o menos profusamente, se efectuaron con anestesias inhaladas a base de ciclopropano-oxígeno solos o asociados al éter y en algunos recurriendo a la inyección intravenosa de intocostrina (curare), para reducir la cantidad de anestésico y mejorar la relajación muscular.

Las operaciones cesáreas todas ellas segmentarias, transperitoneales, con histerotomía longitudinal o transversal se hicieron con diversos métodos analgésicos o anestésicos

Las bases para la selección se tomaron atendiendo al estado general, a las cifras de la tensión arterial, el pulso materno, el pulso fetal, el tiempo del trabajo, el peso de la paciente, a la presencia o ausencia de signos de shock obstétrico o hemorrágico, de estados de toxemia gravídica o preeclampsia, de la presencia de distocias de contracción y al hecho de la ingestión próxima de alimentos.

Las pacientes hipotensas solo recibieron anestesias a base de ciclopropano-éter-oxígeno, con o sin pequeñas cantidades de curare intravenoso para mejorar la relajación.

Siete fueron realizadas usando analgesia local según técnica de Beck modificada y complementada como es de rigor, con pequeñas dosis de óxido nitroso, ciclopropano o pentotal.

La introducción de éste procedimiento fué considerada como una de las más útiles aportaciones hechas por el servicio de anestesiología del Hospital, y aunque el método no es nuevo, sí es verdaderamente notable en sus resultados y desgraciadamente no se ha popularizado en nuestro medio todo lo que debiera.

Las modificationes hechas por el autor a la técnica original de Beck amplían las posibilidades del método y lo modernizan según el estado actual de nuestros conocimientos en Anestesiología.

La experiencia acumulada por el autor, nos permite afirmar que vamos teniendo una interesante estadística cuyos resultados traeremos en próxima comunicación.

El procedimiento es de elección para pacientes en precarias condiciones o en aquellas en quienes la ingestión próxima de alimentos puede contraindicar anestésicos inhalados. No obstante, es de aplicación casi general, con exclusión de aquellos en que el producto se halla en posición transversa.

Las enfermas con buen estado general, buena tensión arterial y producto sin sufrimiento fueron intervenidas con raquianalgesia clásica o fraccionada de Lemmon, a dosis mínima.

La atención del personal del Quirófano y particularmente del autor, se extendió a los niños nacidos por maniobras toco-quirúrgicas u operaciones cesáres.

Siempre previmos productos apnéicos, los nacidos por aplicación de forceps, versión por maniobras internas y gran extracción podálica, cesárea y los prematuros, sobre todo si el pulso fetal antes de la operación era de menos de 100, de más de 160 latidos por minuto o arrítmico o muy débil. Lo propio si había expulsión de meconio, todos ellos signos de gran sufrimiento fetal por anoxemia y también si la madre había tenido un trabajo de parto prolongando, presentaba signos de shock, había habido pérdidas sanguíneas repetidas o profusas que descendieran la tensión arterial a 100 mms. o menos, con un descenso de la tensión diferencial o presión del pulso y por último, los niños de madres con toxemia grave o eclampsia.

Fué preocupación nuestra dar a los recién nacidos apnéicos la atención integral que actualmente se aconseja para el tratamiento de la apnea neo-natorum, que fué la siguiente:

El niño extraído fué motivo de una aspiración de las secreciones acumuladas en la garganta, por parte del Obstetra.

Recibido entonces por el Anestesiólogo, se procedió a completar esa aspiración, a introducirle un conducto de aire para recién nacidos y a colocar la mascarilla del resucitador procurando formar un cierre hermético con la cara del chiquillo, regulando entonces el funcionamiento automático del aparato de 20 a 25 ciclos por minuto, estando el pequeño acostado, con la cabeza hiperextendida y bien arropado para evitar el enfriamiento.

Si la respiración se establecía con ésta maniobra, entonces se cambiaba la resucitación automática por inhalaciones de oxígeno, previo retiro del conducto de aire y manteniendo el cambio hasta que el color del niño fuese francamente rosado y la respiración de buenos caracteres.

Si durante un tiempo prudente (2 a 3 minutos) la resucitación automática no inducía el ciclo respiratorio, entonces procedimos a hacer una laringoscopía directa y con la sonda flexible hicimos la aspiración endotraqueal de las secreciones, de modo muy delicado e intermitente. Al terminar, se volvió a instalar la resucitación mecánica, manteniéndose ella hasta la aparación espontánea de los movimientos respiratorios, con lo que la mayoría de los casos fué suficiente para reanimar al producto.

Seguidamente, el pequeño fué colocado en incubadora a correctas condiciones de calor y humedad y proveyéndole una corriente de oxígeno de 3 a 8 litros por minuto, condición en que se le mantuvo de una a varias horas, según sus condiciones.

La resucitación fué hecha siempre con oxígeno puro, contra lo que frecuentemente se vé de usar carbógeno (al 5% ó más), pues a la luz del conocimiento fisiopatológico de la apnea neo-natorum, el centro respiratorio se halla deprimido y el bióxido de carbono no actúa en esas condiciones como excitante, sino precisamente como depresor.

Tampoco usamos drogas analépticas: coramina, alpha-lobelina, cardiazol, por la misma razón. La segunda de ellas no actúa propiamente sobre el centro respiratorio sino por estímulo de los corpúsculos carotídeos, cuya función no se halla básicamente trastornada en el caso que comentamos.

Por último, después de un tiempo de observación, los pequeños fueron remitidos a las Centrales de Cuna (los de término, talla y peso normales), y los prematuros a la Sección respectiva para su atención médica y asistencial.

No quisiéramos pasar por alto el mencionar que bajo los principios arriba indicados, el autor realizó un extraordinario caso de resucitación del recién nacido, en el cual se pudo establecer el ciclo respiratorio hasta hora y media después de iniciadas la maniobras de reanimación.

La Oxigenoterapia tuvo también importante misión en nuestro Hospital.

En la Sección de Prematuros se mantuvieron buen número de incubadoras en constante funcionamiento, cosa que motivó que el autor hiciese una labor de enseñanza acerca del correcto manejo de ellas en lo que concierne al mantenimiento del calor, concentración de humedad y requerimientos de oxígeno de los niños prematuros, completándose todo con una supervisión diaria a dicho Servicio.

Se instruyó a las enfermeras en el modo de hacer la aspiración faríngea y endotraqueal de secreciones por simple sonda, la aplicación del drenaje postural, etc., para la prevención de la atelectasia pulmonar.

Pocas enfermas requirieron oxígeno de las secciones de hospitalización, seguramente al hecho de que las operadas no salieron de las Salas de Operaciones sin antes haberse recuperado de la anestesia y del shock.

Algunas eclámpticas que ingresaron en estado de coma también recibieron oxigenoterapia, aunque desgraciadamente sin gran alivio.

Terminamos esta modesta contribución afirmando catergoricamente que las normas motivo de este trabajo dieron esplendidos resultados, contribuyeron a la delimitación de las capacidades de cada uno de los miembros del *team obstetrico*, permitieron la aplicación de los modernos conceptos que rigen la atención del enfermo quirurgico en beneficio de la enferma obstetrica y permitieron la realización de trabajos tocoquirurgicos y operatorios a veces espectaculares, en beneficio de las madres y los recien nacidos.

Queremos enfatizar de modo muy especial, que estos casos de muertes operatorias *no* se debieron a consecuencia de las normas que hemos comentado extensamente, sino precisamente a la violación de ellas por parte del personal de Enfermeras y de uno de nuestros medicos obstetras.

De haberse seguido integramente nuestras recomendaciones, esos decesos no habrian ocurrido y hubiesemos podido presentar, a no dudarlo, una estadística "limpia," que hubiese rivalizado con muchas de las mejores del extranjero y de otros países latino americanos.

ESTADISTICA

Total de operaciones realizadas en el Quirofano	471
Total de intervenciones tocoquirurgicas	424
Clasificacion	
Legrado digital intrauterino	143
Legrado instrumental intrauterino	58
Induccion de parto	9
Perineoplastias	4
Version interna o mixta	18
Gran extraccion podalica	33
Fetotomias	3
Forceps	91
Cesarea baja, transperitoneal	57
Laparotomia por embarazo extrauterino	10
Operaciones diversas	48
Mortalidad materna operatoria general*	0.42%
Mortalidad materna operatoria tocoquirurgica	0.47%
Mortalidad materna operatoria por cesarea	3.50%
Total de niños nacidos en el Quirofano	199
Total de recien nacidos que respiraron espontaneamente	141
Total de recien nacidos apneicos que se reanimaron	31
Total de recien nacidos que no se reanimaron	5
Total de niños mortinatos	22
Total de infecciones postoperatorias imputables al acto quirurgico en si	0

SUMMARY

Operating room and anesthesia routines were established by the author leading to team work in operative obstetrics. In hospital practice an operative delivery should be done if incipient signs of shock appear in the patient. Dehydration and shock must be prevented by parenteral administration of adequate fluid, electrolytes and plasma during labor. Solid food should be withheld during dystocic labor and during delivery, as vomitus may be aspirated to the respiratory tract during general anesthesia.

Hemorrhagic shock must be treated promptly and adequately by blood transfusion, the compatibility as to blood groups and Rh factor being carefully checked. The amount given depends on the patient's general condition: blood pressure, pulse, hematocrit reading, erythrocyte count and hemoglobin level.

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*En total hubo dos muertes en la mesa de operaciones. En un caso la enferma había tomado alimentos una hora antes de practicársele una cesárea y la muerte se debió a obstrucción aguda de las vías aéreas por aspiración de contenido gástrico durante la inducción de una anestesia por inhalación. El producto nació apneico pero se le reanimó.

En el otro el obstretra pretendió realizar una cesárea a una paciente en precarias condiciones sin esperar a integrar debidamente el team quirúrgico (no hubo anestesiólogo ni primer ayudante). Momentos despues de recibir una raquianalgesia clásica la enferma y el niño murieron a causa de un colapso circulatorio agudo.

Sustained hypotension pressure (80 mm. of mercury or less) kills the fetus by anoxemia, for the active circulation has a deficit of 25 percent or less of the circulating blood volume. Before an operative (abdominal) delivery is performed, uncompensated obstetric or hemmorrhagic shock must be present. Fluid and electrolyte balance must be maintained by the parenteral route during operation and after it until the patient is able to take liquids and food by mouth. The crystalloid solutions are controlled by a urine elimination of no less than 1,000 cc. and a chloride excretion of four to eight Gm. in 24 hours.

Preeclamptic and eclamptic women in normal delivery or cesarean section should receive an intravenous infusion of 500 cc., or more than 20 percent, of dextrose in distilled water, concentrated plasma, or human serum albumin. Small transfusions of whole blood should also be given under laboratory-controlled conditions: hematocrit, serum proteins, albumin-globulin ratio, erythrocyte count, hemoglobin percent, blood and plasma specific gravity, etc.

Demerol-atropine or demerol-scopolamine was administered preoperatively. Surgical (non pregnant) patients received a barbituate three hours before operation and an injection of morphine-scopolamine or pantopon-atropine one hour before. Preeclamptic or eclamptic patients were given moderate doses of acetylcholine intramuscularly or intravenously, to reduce the blood pressure and to improve the anesthetic risk.

Drainage and curettage for incomplete abortion were done under inhalation anesthesia, if the risk was "bad" or "fair." Intravenous anesthesia or low spinal saddle block (procaine, 0.03 to 0.05 Gm. in one cc. of ten percent dextrose solution) plus inhalation of a nitrous-oxide mixture, if the risk was "good."

Medium or low forceps operative deliveries received low spinal saddle block unless definite hypotension (95 mm. Hg. systolic or less) was present, as such cases were handled under general anesthesia (to second plane, third stage).

Internal version and podalic extraction were performed under a general anesthesia (to third plane, third stage), to provide a fair uterine relaxation. Saddle block was not used in the cases for danger to uterine rupture during delivery.

At first, low cervical, transperitoneal cesarean sections were done under general anesthesia if the risk was "poor" or "fair". Lately, a slightly modified Beck's technic of local analgesia was used by the author. "Good" risk patients were operated on with minimal single or fractional spinal analgesias plus oxygenation in an anesthetic machine.

Apneic babies were reanimated or resuscitated by pharyngeal or endotrachael aspiration and sustained mechanical artificial respiration through a "suck and blow" resuscitator machine, with pure oxygen. No carbon dioxide or analeptic drugs were used. A remarkable resuscitation in a new born infant was performed by the author in which spontaneous respiration started 90 minutes after a medium forceps operative delivery.

Summaries in Spanish

KIRWIN: TUMORS OF BLADDER

La causa de las neoplasias de la vejiga aun es un misterio. Sin embargo hay suficiente evidencia que indica que ciertos casos se deben a infecciones virulogicas.

El papiloma solitario o multiple es el tumor vesical mas frecuente. La region del trigono vesical es el sitio de prediheccion de las neoplasias. La cistoscopia es el procedimiento de mas importancia en el diagnostico de los tumores vesicales; sin embargo, la biopsia, la cistografia, y el examen bi-manual bajo la anestesia (Jewett), son metodos adjuvantes indispensables.

El tratamimiento de las neoplasias vesicales consiste de los siguientes procedimientos:

a. La excision simple seguida por la cauterizacion o la implanta cion del radon. Este metodo es de uso general.

b. Los procedimientos suprapubicos y las resecciones intrauretrales, que son hoy en dia muy populares.

c. La cistectomia total con implantacion ureteral. Este metodo es sin embargo muy radical y por lo tanto de dificil aplicacion en la mayoria de los pacientes ya debilitados por la enfermedad o por la vejes.

d. La radioterapia en todas esus modalidades se usa en general en conjuncion con los otros procedimientos terapeuticos.

En mi opinion los adelantos de los ultimos anos han sido mayores en el perfeccionamiento de technicas que nos permiten con mas seguridad el evaluar la curabilidad potencial de la neoplasia vesical en cada paciente. Este progreso se debe en parte a las investigaciones de varios autores, y, en especial, a estudios histopatologicos y a la compilacion de las observaciones hechas por medio de la palpacion bimanual. Mi metodo de excision del tumor con el cuchillo electrico seguido por la aplicacion de la glicerina fenolada y alcohol han dado en mis manos buenos resultados. Este procedimiento terapeutico es bien tolerado, aun por los pacientes ancianos y debilitados, pues no ha mostrado mortalidad inmediata. Las estadisticas del presente sobre el tratamiento de los tumores vesicales permiten un mayor optimismo. Sin embargo, el prognosis aun no es tan favorable como uno lo desearia, y ciertamente menos de los que ciertos autores nos hacen creer.

BACON AND SAUER: TREATMENT OF RECTAL CANCER

En nuestra opinion deberian de haber mas de un procedimiento en el tratamiento del cancer rectal.

1. Cuando la lesion esta por mas de 3 cms arriba de la lina pectinada, la musculatura del esfincter se puede preservar si el cirujano reseccta completamente el recto y los musculos elevadors del ano. Las siguientes menciones de la literatura reciente revelan la importancia de la reseccion completa del recto para evitar el peligro de la propagacion retrograda del tumor: D'Allaines,[5] en resecciones de tres centimetros por debajo de la lesion tuvo 2 casos de recurrencia en la porcion distal del intestino en una serie de 100 casos. Denis[18] tuvo 3 casos similares. La reseccion de los elevadores es esencial, por cuanto ciertas de las glandulas linfaticas anorectales, que contienen metastasis, se encuentran muy proximas a estos musculos y solo la reseccion completa de ellos las puede remover. Tambien la reseccion de los elevadores ofrece la unica manera de extirpar los ligamntos laterales y, como es sabido, estos ligamentos son la via de mayor importancia en la envasion lateral del tumor.

La operacion de Babcock, tal como ha sido modificada por uno de nosotros, asegura los objetivos indicados arriba. Esta tecnica es tan radical como la de Miles cuando el tumor se encuentra por arriba de la region intermediaria.

Una tecnica similar fue descrita por Ricard[49] y Roux[50] en el tratamiento del cancer rectal. Otras modificaciones han sido descritas por Swenson[51] y Blake.[52]

Las operaciones que preservan un segmento del recto no son lo suficientemente radicales. Ciertas de estas operaciones que fueron reportadas en el pasado han sido recientemente revivadas por Wangensteen,[53] Dixon,[3] D'Allaines[5] y otros, con buenos resultados. Si embargo las ultimas publicaciones de Wangensteen y de Nix on revelan que estos procedimientos son limitados en sus indicaciones, por cuanto solo se pueden usar cuando la lesion esta muy alta en el recto, i.e., en una area muy limitada donde no hay peligro de propagacion lateral del tumor y que permite por lo menos la reseccion del recto a un nivel de 5 cms por debajo de la lesion.

2. No hay duda que el procedimiento de Miles es el de seleccion cuando hay posibilidades de propagacion del tumor hacia abajo, por cuando este metodo permite la reseccion de las glandulas linfaticas que se encuentran en el trayecto de los vasos hemorroidales superiores, y tambien las que sencuentran en el paniculo adiposo peri-a-nal.

3. La operacion de Miles, en si, no extirpa completamente la region lateral, por lo tanto una diseccion de esta region pueda ser de valor, especialmente en los casos en que haya posibilidad de invasion de las glandulas en esta region. Esta diseccion debe de extenderse desde los vasos iliacos externos, extirpando las glandulas iliacas e hipogastricas. Las glandulas sacrales laterales y medias se pueden disectar generalmente durante la liberacion de la pared posterior del recto.

KALIMA: CONNECTIVE TISSUE

Se ha discutido el significado quirurjico de los tejidos conjuntivos y sus derivados bajo el punto de vista de su embriogenia (ontogenia). Tambien se ha presentados los puntos salientes en la genesis del ectodermo, entodermo y mesodermo y la influencia que estas tres hojas embrionarias tienen sobre el organismo humano, en el estado de salud o enfermedad. Se ha prestado atencion especial a sus implicaciones quirurjicas, particularmente, en su relacion con la cirujia plastica, auto-transplantes, y en el tratamiento quirurjico de las enfermedades articulares.

WATSON: POSTOPERATIVE INGUINAL HERNIA

El autor discute el tratamiento de las grandes hernias inguinales recurrentes, dando enfasis a los resultados obtenidos por diferentes metodos de tratamiento. La tecnica operatoria que usa el ligamento de Cooper, el uso del parche de aponeurosis, del pediculo aponeurotico, y del injerto dermal han sido descritos y las ventajas de sus usos respectivos han sido evaluados.

BEHREND AND BEHREND: SKIN GRAFT HERNIA REPAIR

Las hernias grandes primarias o recurrentes, que se consideraban en el pasado como incurables, por razon de su tamano o deficiencia celular, se pueden reparar por medio de transplantes autogenos de piel que contengan todas sus capas. Estos injertos se usan para fortalecer las regiones debiles. Estudios experimentales demuestran que estos injertos de piel cuando se entierran en los tejidos celulares profundos se unen a estos tejidos. Las capas epidermicas incluyendo sus estructuras glandulares se atrofian con el tiempo y el transplante finalmente asume la apariencia de tejido fibroso. 16 pacientes han sido operados por este metodo y solo uno sufrio de recurrencia (esto no se ha confirmado) La unica complicacion que se presento en estos casos fue drenaje de la herida, que ocurrio en 4 pacientes pero no interfirio con la curacion completa de ellos.

MATHÉ: HYPERPLASIA OF PROSTATE

El autor ha presentado, en revista, el progreso que se ha hecho en el tratamiento quirurjico de la hiperplasia de la prostata y discute los cuatro procedimientos mas corrientes en dicho tratamiento.

En los tumores benignos de la prostata existe hiperplasia, no hipertrofia, y el tumor siempre esta encapsulado; por lo tanto, el diagnostico patologico es el de la hiperplasia y no de hipertrofia.

El examen clinico debe de ser detenido, y debe de incluir la palpacion manual del recto en todo los casos, por cuanto dicho examen es de gran valor diagnostico. La urografia intravenosa se debe de practicar, tanbien, en todos los casos.

En los Estados Unidos el 60% de los casos son tratados por la reseccion endoscopica. 96.7% de las prostatectomias por incision quirurjica se practican por la via suprapubica, por el metodo que se ha descrito.

La operacion por la via perineal se practica en casos de cancer de corto tiempo o en casos de hiperplasia con calculo La prostatectomia por la via retropubica se esta popularizando por cuanto ofrece una ruta directa, permitiendo la diseccion anatomica de la glandula bajo vision directa, elimina la abertura de la vejiga, y no peligra el segmento rectal del colon El pentotal sodio, suplementado por el oxigeno y oxido de nitrogeno, es el metodo de anastesia ideal en los pacientes de edad y debilitados Su uso en combinacion con el curare es excelente en los casos que requieren mas relajacion muscular

Todo urologo debe de estar bien familiarizado con todos los metodos quirurjicos empleados en el tratamiento de la prostata, pues solo asi, el podra utilizar el metodo mas practico en cada caso En general, el autor recomienda la prostatectomia en las hiperplasias de mayor tamano y la reseccion transuretral en las menores, (30 gms o menos)

Se ha reducido considerablemente la mortalidad en la cirujia de la prostata y esto se debe aun mejor reconociento de la enfermedad, al uso de metodos de anestesia menos peligrosos para el paciente, a la preparacion pre operatoria y post operatoria, que incluye el uso de antibioticos y de la sulfaterapia Se ha presentado un analisis comparativo de la mortalidad en los casos que han sido operados durante los ultimos 19 anos en el Hospital "Southern Pacific General Hospital "

IMPERATI ET AL CURARE AND SHOCK

La influencia del curare sobre el shock es de importancia en el campo de investigacion clinico experimental y en sus aplicaciones en la cirujia y en el estudio de los mecanismos fisiopatologicos del shock

Los experimentos del autor en el conejo justifican las conclusiones siguientes

1 Doses pequenas y repetidas de curare previenen el shock Sin embargo es importante el evitar doses excesivas

2 *En los animas que sufren del shock profundo*, el curare tiene un efecto positivo en la elevacion de la presion arterial y en la eliminacion del shock

Es la opinion del autor que estas investigaciones prueban que el curare tiene propiedades especificas con tra el shock, y que estas propiedades se deben a su influencia sobre el systema catalitico que controla la produccion del acetilo de colina Esta actividad farmacologica del curare confirma nuestra hipotesis, que el factor determinante en la patogenia del shock se forma por la mediacion del acetilo de colina, el cual es bloqueado por el curare

JAEGER HEADACHE

El autor discute ciertos de los tipos mas comunes de cefalalgia cronica, los cuales deben de ser mejor comprendidos y estudiados bajo el punto de vista del sentido comun En general todos los tipos cronicos se pueden clasificar en dos grandes grupos (1) La jaqueca cronica (migranosa) y las cefalalgias atipicas que guardan relacion con ella (2) Las cefalalgias cronicas que responden al tratamiento especifico En la jaqueca cronica (migranosa) es importante el uso de un tratamiento, aunque sintomatico, que sea efectivo El estado mental del paciente requiere gran atencion, por cuanto el generalmente sufre mas por la anciedad, que por el dolor fisico El tratamiento de las cefalalgias que se deben a condiciones especificas, requiren un examen minucioso, pues solo asi se puede hacer un verdadero dignosis e instituir el tratamiento mas apropiado Estos en general deben de tomar en consideracion el diagnostico neuro quirurjico y ciertos metodos mecanicos Con los dolores de cabeza que pertenecen a esta categoria, el tiempo es de importancia y, por lo tanto, el menor tiempo posible debe de pasar entre el comienzo de la enfermedad y la institucion del tratamiendo quirurjico mas apropiado

MC GEE OBSTETRICAL EMERGENCIES

El autor ha discutido bajo el punto de vista de su experiencia y de el conocimiento moderno las siguientes condiciones patologicas la pre eclampsia, eclampsia, la placenta previa, la ruptura del utero, y la hemolrragia del puerperio Tambien describe los procedimientos que se emplean en el tratamiento de cada una *de ellas*

FICARRA THYROID PROCEDURES

Se ha presentado un estudio critico de 100 casos consecutivos de cirujia de la glandula tiroides, en los cuales no hubo mortalidad, morbilidad o infeccion de la herida En esta serie se presentaron todo los tipos patologicos de dicha glandula con excepcion del estruma de Riedel. El autor llama la atencion a la frecuencia de la fobia como sintoma del hipertiroidismo. Tambien menciona las exacerbaciones del hipertiroidismo durante el climaterio. Discute el valor terapeuticos de las diferentes drogas anti-tiroideas. Menciona el valor post-operatorio de la traqueotomia electiva. Esta serie soporta el concepto moderno de que la tiroidectomia hoy en dia se puede practicar sin mortalidad y morbilidad; y esto se debe en gran medida al uso preoperatorio de las drogas antitiroideas que son de gran valor en la eradicacion de las crisis tiroideas.

WEYL: ANESTHETIC PROCEDURE OF CHOICE

El autor discute varios de los anesteticos mas modernos, sus tecnicas de administracion y sus indicaciones y contra-indicaciones, llamando la atencion a los peligros inherentes a su administracion. Da enfasis al estado general del paciente, al entrenamiento experiencia del anestetista y del cirujano, y a la necesidad de mantener el balance adecuado de los fluidos del paciente durante la operacion.

SCHATTYN: TUBERCULOSIS OF URINARY TRACT

El autor declara que el aceite de chalmugra combinado con doses pequenas de streptomicina es de valor en el tratamiento medico de la tuberculosis de las vias urinarias. Esta terapeutica ha transformado el tratamiento paliativo-quirurjico de esta enfermedad al tipo medico-quirurjico. Por lo tanto combinaciones logicas de terapeutica medica con la quirurjica estan en orden.

Se presenta una clasificacion terapeutacia de los diferentes tipos clinicos de la tuberculosis de las vias urinarias, y se han dado las indicaciones medicas y quirqurjicas en el tratamiento de cada tipo.

FURLONG: COMPLETE ADENOIDECTOMY

El autor recomienda mas juicio en el uso de los diferentes instrumentos que estan al alcance del cirujano en la practica de la adenoidectomia.

El objeto es el practicar la adenoidectomia y no la adenoidotomia; por lo tanto el cirujano debe de ejercer el mismo cuidado en esta operacion que el ejerce en la reseccion de las amigdalas.

BRADY: ACUTE INTUSSUSCEPTION

Se ha hecho una revista historica de la intusucepcion como causa etiologica de la obstruccion intestinal en los adultos. Se han reportado dos casos, uno en el hombre y el otro en la mujer. Uno de los casos fue causado por un tomor y el otro por un diverticulo de Meckel que se habia invertido. El tratamiento fue operatoria, con mejoria completa de los dos pacientes.

Editorial

Intravenous Pentothal Sodium Anesthesia

ALTHOUGH most surgeons still administer gas anesthetics by inhalation, there is a growing tendency toward narcosis induced by direct introduction of an anesthetic into the blood stream Since any gas must be carried throughout the system by the circulating blood in order to affect all tissues, why not inject a fluid anesthetic directly into the vascular system?

Experiments with the inhalation of synthetic agents are constantly being made, but all such agents have certain disadvantages especially the explosive ones Every operating room now carries "Caution" signs or warnings to visitors, but it is possible that even the electricity from a human body may generate a spark sufficient to ignite a highly inflammable substance Anyone who has crossed a room and touched metal under certain conditions can testify that the electricity is there, but whether such a tiny current is sufficient to bring about a casualty has been neither proven nor disproved

One may venture the assumption that chemical researchers working on the problems of narcosis are doing less and less with gaseous substances and more and more with fluids Out of their work has come the application of pentothal sodium to the needs of the surgeon Both surgeon and patient are vitally concerned as to "the best method of securing sleep' during an operation Many patients who have had ether or its analogues or adjuvants strongly object to the nauseating dose the struggle for breath, and the subconscious or semiconcious apprehension of impending disaster when another operations is in the offing These objections are well sustained by the facts and to overcome them is one of the most difficult tasks a surgeon encounters

An excellent résumé of the rôle of pentothal sodium was offered in the well written article by Dr D L Rater of Ottumwa, Iowa in this JOURNAL for March April 1949 (Vol XII, No 2)

For some three years this surgeon has used pentothal sodium in routine surgical procedures, from removal of a sebaceous cyst to a cesarean section "Approximately 92 percent experienced *no* postoperative nausea or vomiting" A cursory glance at Dr Rater's tabulation shows the ages of the patients to have been from 6 to 85, and the duration of operation from 36 to 137 minutes "Surgeons who have used pentothal sodium find it fulfils their most exacting requirements in all forms of surgical procedure"

There are, however, dangers, therefore an intensive study must be made of the patient in the preparatory stage One might assume this to be a *sine qua non* in all cases, but there is evidence that oversights are not uncommon There are, of course, the "complete physical" and the laboratory tests (complete blood tests, metabolism tests and x rays when called for), but stress is laid upon the patient's age, condition and clinical history Debility, anemia, cardiac disease, diabetes senility and any other conditions tending to make the patient a "poor surgical risk" must be considered Bed rest, extra fluids and attention to elimination are important Vitamin deficiency should be corrected The blood type should be known Data on the previous use of drugs (barbiturates or narcotics) and of alcohol are important Flatulence is not to be tolerated, and in persons so disposed fluids should be allowed for only 24 hours prior to operation and nothing at all given by mouth after midnight Morphine and atropine may be administered hypodermically one hour before operation except to the very young the very old, and women for whom cesarean section is planned The patient should come to the operating room with a flat abdomen, free of gas and in a good frame of mind; extreme nervousness may call for postponement of the operation.

The technic at the operating table cannot be described here. Suffice it to say that after the flow has been established into a vein, it is adjusted to infuse 60 drops of pentothal sodium per minute for about two minutes—that is, until all reflexes have been satisfactorily reduced as in any other anesthetic procedure. This may be tested by stroking the eyelashes, touching the pharynx or pulling on the tongue. One must then judge whether the rate of administration can be continued or should be reduced to 45 drops per minute or less. The airways must be cleared by suction and kept free at all times. Oxygen is administered at a rate of 300 to 500 cc. per minute. Constant vigilance is of paramount importance; too great concentration of the anesthetic in the blood may cause respiratory paralysis, which is usually temporary but may be permanent. Useful as this drug is, it is not foolproof, and death has occurred during its administration. Artificial respiration for a few minutes will usually restore normal breathing, with fresh oxygen intake. If response is lacking, either coramine, metrazol or picrotoxin should be given. The time limit is from two to three minutes. Five minutes' delay is almost certainly fatal! Heartbeats may continue while the blood pressure falls.

At times, adjuvants are desirable. Curare is an aid to relaxation and is to be preferred to the increase or deepening of the anesthesia; nevertheless, an overdose of this useful drug can paralyze the respiratory muscles and result in death. The first dose may be 60 units (3 cc.) into the vein, but for "poor risk" patients it is better to give only 20 units (1 cc.). The rate and character of repiration are of first importance. Overdosage may be corrected by administration of prostigmine 1/2000, but not more than 1 or 2 cc. should be given.

Coramine stimulates the circulato[illegible] and nervous systems and increases the blo[illegible] pressure [illegible] g the coronary vessels. Its [illegible] is lo[illegible] shortens narcosis if gi[illegible] doses [illegible]

Metrazol is useful as a respiratory and cardiac stimulant *if given slowly*. Convulsions may follow too rapid administration.

When endocrine imbalance seems obvious, as in patients with Addison's disease, adrenal cortex extract is in order, given intravenously in doses of 1 to 2 cc. In a crisis, the dose may have to be 40 to 50 cc.

Picrotoxin is useful in cases of barbiturate poisoning, since it stimulates the central nervous system. The initial dose is 2 cc., given intravenously.

The use of pentothal sodium calls for close teamwork between the anesthetist and the surgeon. In fact, the anesthetist should have an opportunity to visit and study the patient in the preoperative stage, since he is after all the "engineer" who takes the patient's life in his hands.

He should know the history (especially if there is past or present drug addiction), the results of the complete physical examination, the blood picture, the state of cardiac and renal function, and the metabolic evidence. Since detoxification is a function of the liver, he should know the capabilities of this organ and, if there is time, insist that the glycogen reserve be made sufficient. In the presence of "lung trouble" (pleurisy with effusion, pneumonia, tuberculosis, malignant disease) anesthesia becomes a major problem, but it is complicated less when pentothal sodium, rather than an inhalation anesthetic, is employed.

Opinion seems to be lining up in favor of the continuous intravenous drip method. The anesthetist is at the side of the table and not in the surgeon's way. He can administer adjuvants, if necessary, without disturbing the operative routine; he is strictly "on his own." Moreover, since his responsibility seems to be greater, relatively, than has heretofore been conceded, the anesthetist *must* be a doctor of medicine with a broad outlook upon the patient as a whole, not merely as a subject who has to be "knocked out" for the purpose of surgical treatment.

I. W. VOORHEES

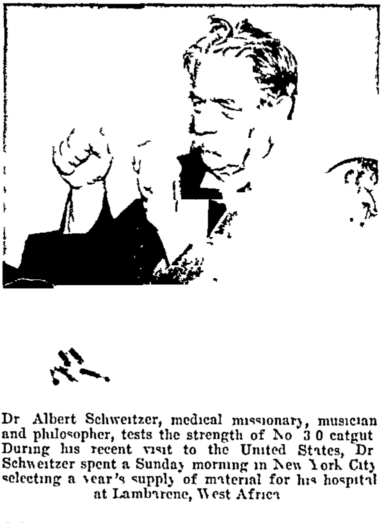
New Horizons

By the Editor

Albert Schweitzer
Apostle of Humanitarianism

It is a truism that versatility is one of the marks of genius The world has known many great men whose prodigality and variety of talent was almost breath taking, the example of Leonardo da Vinci springs first to mind It need not surprise or unduly impress any thinking person that a man who has a really titanic endowment in one respect should evince an equal or a nearly equal endowment in others But it is rare indeed to find a man of this caliber abnegating not only personal ambition but the elementary comforts of every day life in order that he may devote his energies—not a measured part of them, but all—to the daily, hourly unremitting service of "the least of these" Dr Albert Schweitzer, whose life for many years has been spent in ministering to savages and cannibals, has done and is still doing exactly that

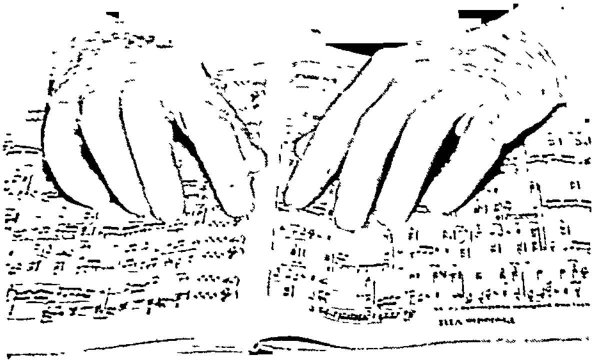
Author, philosopher, preacher, musician and healer—internationally known and universally beloved in all five capacities—Dr Schweitzer chose the African natives as his people for the simple reason "they needed doctors" The brevity and pungency of this explanation is characteristic of the man As he wastes no time at his post in the African hinterland, so he wastes no time and no words in elucidating and justifying the sacrifice he has made To him it is self explanatory and needs no justification Here is another truism, this time a truism less generally known that a sacrifice made in love is no sacrifice at all Dr Schweitzer, who has a clinical knowledge, so to speak, of sacrifice and its surprising nature, is only amused when the word is mentioned now His keen, good, humorous face lights up as though some secret idea delighted him, and it is not hard to find in this look a touch of reminiscent self-derision, for he too once thought of sacrifice in the conventional way Deciding to forsake theology for medicine as the focal field of his endeavors, he did not find his chosen course an easy one Already a famous man in several fields, with a career of uncommon brilliance opening out before him he went so far as to doubt that he could do it "I prepared," he says, "to make three sacrifices, to abandon the organ, to renounce academic teaching activities, and to lose my financial independence



Dr Albert Schweitzer, medical missionary, musician and philosopher, tests the strength of No 3 0 catgut During his recent visit to the United States, Dr Schweitzer spent a Sunday morning in New York City selecting a year's supply of material for his hospital at Lambarene, West Africa

Now there happened to me what happened to Abraham when he prepared to sacrifice his son I, like him, was spared the sacrifice The piano with pedal attachment built for the tropics and the triumph of my own physical health over the tropical climate allowed me to keep up my skill on the organ For the renunciation of my teaching activities at Strassburg University, I found compensation in opportunities for lecturing elsewhere. If I did for a time lose my financial independence, I was able to win it again by means of pen and music. . . . This buoyed me up and made me ready for every effort and every renunciation."

The nature and details of Dr. Schweitzer's work in Africa are too well known, especially since his recent visit to the United States on the occasion of the Goethe festival, are too well known to need repetition here. The immense significance of the man and his work lies not in the work itself, impressive as it is, but in the philosophy of life that engendered it and sustains it. Reverence for life—all life—is Schweitzer's watchword, and love of humanity is the motor power behind him. God's commandment of universal love is to him a summary of all that is worth knowing about the conduct of life. "It is only through love," he says again and aagin, "that man can attain to communion with his Maker." This conviction carries the necessary corollary of belief in the essential worth and dignity of man. "If that ideal is abandoned, the intellectual man goes to pieces, and that means the end of culture and even of humanity."



The hands of Dr. Albert Schweitzer.

The truth of this pronouncement should be so obvious as to require no statement of it, but the condition of the world at present is tragic evidence that it is not so. If ever a prophet was needed he is needed today. If ever an apostle of truth—truth tried and proved and triumphant—was needed to recall mankind to the essential verities, to defend the vital significance of culture and the arts, to uphold the intrinsic rights and destiny of man, this is the time. All the bootstrap-lifting tactics in the world cannot save the situation; but if the tremendous power of love, sacrifice and self-forgetfulness were once unloosed among us, there would be such a renaissance of beauty and valor as would stop the breath.

All men of good will may well congratulate themselves that the message is spoken by one whom all men love. The late Gilbert Keith Chesterton once remarked—how truly!—that there is no saint so powerfully persuasive as a charming saint, and Dr. Schweitzer's charm is universally acknowledged. Here is no canting prude, no tin-horn do-gooder. Here is a man among men, a scientist, an artist, a philosopher and a friend. Here is a man who says what he says because he knows it is true—knows it because he learned it by the sweat of his brow and the labor of his hands no less than by study and research and rational thought. His wisdom, in an age like this, is astounding. Beside it, the tinsel glitter of "sophistication" shows itself for the tawdry thing it is. Well may the medical profession pride itself upon such a colleague as Albert Schweitzer. We, like him, are by the very nature of our work the heirs of privilege, in that our words are listened to and our lives regarded wherever we'go. Well indeed for the world if the whole profession takes new life and new heart, as certainly it may, from this modern example of what a physician may become.

The pictures accompanying this article are used through the courtesy of Ethicon Suture Labs.

Veracity and Vivisection

The vivisection controversy thus far has been largely a one sided combat, chiefly because the busy and sensible scientists who cover the field of medical and surgical research have found it difficult to take the matter seriously That mature men and women, presumably intelligent, presumably educated should repudiate one of the most important sources of scientific knowledge, on grounds as reasonless as they are sentimental was not to be believed That powerful organs of the public press should join in the shouting—nay more, even conduct sensational campaigns against the advancement of science—was still more incredible, and for some time the medical profession smiled tolerantly and let it pass

Now, however, it has become only too evident that any pressure group, however flimsy its platform, can become a serious nuisance and a public menace as well The uproar about vivisection is a case in point There can be no question as to the value of animal experimentation so far as human welfare is concerned An overwhelming proportion of modern medical and surgical knowledge begins in the experimental laboratory Some experiments—some vitally important experiments—cannot be performed on dead animals The animals are therefore anesthetized and subjected to operation, just as a human being is anesthetized and subjected to operation when he requires it The difference is merely that the human being undergoes the operation for his own benefit solely, whereas the animal undergoes it for the benefit of all mankind

As often happens when fanatics get hold of an idea, the facts about vivisection—the motives behind it, the methods used, and the extent of suffering involved—are grossly distorted and even falsified by the crusaders who do not scruple to accuse the whole medical profession of deliberate and fiendish cruelty The medical profession has begun to answer back Several state medical journals have recently expressed themselves with appropriate vigor The *Journal of the Iowa State Medical Society*[*] remarks astutely, "The problem seems to be largely one of lack of interest and information inconsistent and illogical points of view rather than conscious opposition to animal experimentation " Encouragingly, the editorial refers to a recent survey indicating that active opposition is probably confined to some three percent of the general public We hope this percentage is accurate, if it is, there is still time to educate the rest of the population before the crackpots take over

The Iowa editorial was picked up and reprinted by the *Pennsylvania Medical Journal*,[**] without comment The *Journal of the Oklahoma State Medical Association*[***] contributes this accessory blast "Long since, many of the antivivisectionists would have been eliminated by disease if knowledge had not been doubled through animal experimentation We say to all antivivisectionists, cheer up, change your mind and be merciful "

This is turning the tables with a vengeance If accusations of cruelty are to be the order of the day, the untruthful and sentimental cruelty that would deny health and even life to uncounted thousands of sufferers may well come in for its share

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[*] Cited by the Pennsylvania Medical Journal
[**] Pennsylvania M J September 1949
[***] J Oklahoma M A October 1949

News Notes

The Sixth International Congress of Radiology

The Sixth International Congress of Radiology will hold its meeting in London on July 23-29, 1950. The sessions of the Congress will be held in the Central Hall (Westminster), and in association with the Grand Scientific Exposition. The Technical Exposition will be presented in the salon of the Royal Horticultural Society.

American Academy of General Practice

The Second Annual Scientific Assembly of the American Academy of General Practice will take place in St. Louis, Mo., February 20 through 23, 1950. The Kiel Auditorium and Opera House will be its headquarters. The Academy is the national scientific organization for general practitioners of medicine and surgery.

CARE to Distribute Technical Books

The Library of the University of Louvain, Belgium, destroyed by Nazi bombing, has received the first collection of books from C A R E. Under the present plan anyone may send donations to the book program. They will be used to purchase the latest and best scientific and technical books published in English.

Congress on Good Eyesight

The National Society for the Prevention of Blindness, in conjunction with the Interim Session of the Pan-American Association of Ophthalmology, will hold a five-day conference March 26-30, 1950, at the Floridian Hotel, Miami Beach, Florida. "The Americas Unite to Save Sight" will be the theme of the meeting. Other subjects to be discussed will be trachoma; industrial ophthalmology; eye problems of school children, and medical and social management of the various types of glaucoma.

The International and Fourth American Congress on Obstetrics and Gynecology

The International and Fourth American Congress on Obstetrics and Gynecology will meet at the Hotel Statler in New York on May 14-19, 1950. The preliminary program includes topics on the physiology of the human reproductive system; its pathology; its social and economic problems; neoplastic disturbances of the female reproductive system; and the proceedings of obstetrics and gynecology. Dr. Fred L. Adair is president. Those interested may communicate with him at 24 West Ohio St., Chicago 10, Illinois.

Tulane University Legal Medicine Program

In order to establish an effective integration between law and medicine on graduate and undergraduate levels, Tulane University of Louisiana, New Orleans, has established a law-science program with Dr. Hubert Winston Smith, former professor of legal medicine at the University of Illinois, Chicago, as research professor of law and medicine.

Establishment of the George Minot Lectureship

It has been the desire of the Section on Experimental Medicine and Therapeutics to establish a "name lecture" honoring an American investigator for exceptional contributions to clinical investigation and therapeutics. Approval has been obtained from the Council on Scientific Assembly of the American Medical Association, and the lecture is to be named after Dr. George Richard Minot of Boston, whose work on the control of pernicious anemia has been recognized throughout the world.

International Code of Medical Ethics

The Red Cross of Monaco will publish a collective work constituting a plan of codification of international medical law. Its purpose is to humanize warfare and prevent such atrocities as were committed during World War II. It is hoped that every medical school and faculty in the world will organize a course in international medical ethics, which will specify the rights and duties of the physician in all circumstances of peace and war.

Forty Million Dollar Clinical Center

Extension of the National Institutes of Health at Bethesda, Maryland, includes a fourteen story, $40,000,000 air-conditioned building, scheduled to be completed in July 1952. It will house one of the best equipped medical and basic science laboratories ever built, together with a 500-bed hospital facility. Patients will be selected from all parts of the country according to the nature of their illness. Only patients with the particular disease under study at the center will be accepted.

The Southeastern Surgical Congress

The Eighteenth Annual Assembly of the Southeastern Surgical Congress will meet March 6-9, 1950, at the Shoreham Hotel in Washington, D. C. The Southeastern Surgical Congress embraces eleven of the Southeastern states, Maryland and the District of Columbia.

New Books

Urological Aspects of Spinal Cord Injuries By George C Prather Springfield Ill Charles C Thomas, Publisher Pp 143 42 illustrations

This interesting monograph is based upon its first prefatory statement The integrity of the urinary tract is vital for the recovery of patients with spinal cord injuries A close correlation of anatomic and neurophysical consideration is required, and Dr Prather draws his conclusions from a quarter of a century of experience with civilian injuries, a great deal of research on military casualties and a considerable storehouse of experimental research statistics

Fully half the book is devoted to the bladder as affected by injuries to the spinal cord Sequelae of spinal cord injury affecting the upper portion of the urinary tract the sexual organs and the kidneys, and ureters are also discussed at length with a detailed account of the results of treatment and an equally detailed though brief program of suggested treatment The illustrations which include roentgenograms pyelograms line drawings and graphic representations are well chosen and illuminating Neurosurgeons, urologists and general practitioners will find special value in this little volume

Fractures By Paul B Magnuson and James K Stack Philadelphia J B Lippincott Company, 1949 5th ed Pp 537, 323 illustrations

An interesting feature of this new edition of a well known text is the addition of a chapter on "farmyard reduction' of fractures, which is accounted for by the authors' conviction that 'the use of gadgets in treatment of fractures has seemed during the past few years, to overshadow common sense and the simple approach to the problem' Drs Magnuson and Stack maintain that although many mechanical appliances have great value, only one splint—the Thomas splint—is fundamental This should raise some lively though good natured argument, for there is something to be said on both sides of the question, nevertheless, speaking generally, it is always encouraging in this complicated age to encounter an advocate of simplicity so long as simplicity does not become oversimplification

The new edition also takes full account of the use of antibiotics, immediate wound closure and full thickness skin grafts in the treatment of wounds and compound fractures Fundamentally, however, no attempt has been made toward radical changes in the basic text As the authors justly remark the fundamentals involved in the treatment of fractures if they are truly fundamental do not change from year to year

Human Pathology By Howard T Karsner Philadelphia J B Lippincott Company 1949 7th ed Pp 927 584 illustrations

Additions to the seventh edition of this recognized classic include two new chapters 800 new bibliographic references and 241 new illustrations as well as numerous revisions and expansions of the former text The new chapters deal respectively with diseases of the eye and diseases of the skin The material on infectious disease has undergone thorough revision to bring it up to date The section on diseases of the liver has been entirely rewritten

The illustrations include a fine collection of photomicrographs and a number of good color plates 'The illustrations are designed to amplify the text rather than to substitute for it In pathology verbal description is essential to understanding The text falls into two general classifications, general pathology and systemic (specific) pathology, the first part being devoted to the morphologic changes in living tissue resulting from disease, the second half to detailed explanation of these changes and their significance in particular disease of particular parts of the human body These verbal descriptions' are excellently done with the meticulous attention to detail that characterizes the histopathologic expert, they make accordingly, smooth and satisfactory reading A book already so well established as Dr Karsner s will undoubtedly maintain the great success it has had heretofore

Operations of General Surgery By Thomas G Orr Philadelphia W B Saunders Company, 1949 2d ed Pp 890, 721 illustrations

This standard work, long known for the excellence of its step by step illustrations of surgical technic as well as for its comprehensiveness and lucidity, has been revised and expanded in its new edition to admit elucidation and illustration of new technics, such as Callander s lobectomy, new operative approaches to the vascular system, the repair of hernias, etc 'The most important additions," says Dr Orr, 'have been made to the chapters on the Digestive System and on Congenital Anomalies The epoch making work of Blalock, Gross and others on the surgical treatment of anomalies of the aortic arch has been added

Within the limits of conservatism, the use of the antibiotics has been emphasized."

Dr. Orr's book is marked throughout by the exact and explicit methods of the surgeon of long teaching experience. Nothing is taken for granted; everything is explained. The illustrations, many of which have been replaced with new ones, are aptly chosen and lavishly employed. In spite of the volume's necessarily imposing bulk, the effect is far from being an effect of heaviness. The quality of the writing, which is well above the average, insures the student's immediate and continuing interest.

Neoplasms of Bone and Related Conditions. By Bradley L. Coley. New York, Paul B. Hoeber, Inc., 1949.

Since there are a number of pathologic conditions affecting the human skeleton that create serious problems in differential diagnosis, Dr. Coley, in his excellent and substantial new work on bone tumor, puts special emphasis upon such of them as may be mistaken for tumor. Even the roentgen picture, he points out, is not always decisive; moreover, some types of bone tumor, notably osteogenic sarcoma, vary so strikingly within their own classification that great care is necessary to obtain an accurate basis for therapy. Among the non-neoplastic conditions often confuesd with tumor are certain vitamin deficiency diseases, disturbances of the endocrine glands, various symptoms of parasitic infestation, bone lesions caused by metabolic disorders or absorption of chemical poisons, and conditions due to disturbances in the blood supply. It is Dr. Coley's opinion that in nearly half of all patients suffering from tumor of the skeletal system the tumor exists "in detectable form" for at least six months before it is correctly diagnosed.

The uses and limitations of irradiation are thoroughly examined, as are the indications for radical surgical treatment, including amputation. There are 622 illustrations, including many fine roentgenograms, and 53 tables. A few photomicrographs are included, but the author's omission of emphasis on the histologic material is intentional, as he feels that this aspect of the matter has been fully and satisfactorily covered by others in the field. In all other respects his text is detailed and complete.

The origin of bone tumors, the conditions that predispose to them, their proper diagnosis, and their treatment, conservative or radical, occupy more than seven hundred pages of well-organized text. An interesting section on the medicolegal implications is included, with considerable stress on the extreme difficulty of being certain that any given bone tumor is actually the result of the injury alleged to have produced it.

Principles and Practice of Rectal Surgery. By William B. Gabriel. Ed. 4. Springfield, Charles C Thomas, 1948.

The first edition of this work appeared in 1932. That the present publication is the fourth is sufficient guarantee of its permanent value. One of its most prominent excellences is the author's style, which makes remarkably easy reading on a difficult subject. The tone is almot that of conversation, yet the content is completely scientific and fully implemented.

There are 278 illustrations and 11 color plates. Many of the illustrations are original with Dr. Gabriel, who places his chief reliance on drawings and diagrams rather than photographs, although both photographs and roentgenograms are used. Primarily the book is, as before, a practical treatment, with emphasis on examination, diagnosis and therapy. Hemorrhoids, rectal prolapse, anal incontinence, rectal carcinoma and carcinoma of the anus receive special emphasis. A separate chapter is devoted to rectal injuries. The surgical anatomy of the anorectal region is lavishly illustrated and thoroughly described, and the general principles of rectal surgery, it indications and contraindications, are outlined.

Injuries of the Brain and Spinal Cord. Edited by Samuel Brock. Baltimore: The Williams & Wilkins Company, 1949. 3d ed. Pp. 783; 123 illustrations.

This standard text, now in its third edition, is the work of twenty-eight authorities in the field. The revision and expansion that preceded publication resulted in the addition of several new chapters, which deal with herniation and protrusion of the intervertebral disc, injuries of the vertebral column and spinal cord, neuroses resulting from injuries to the head and brain, and the effects of electric shock on the human nervous system. It is now nearly eight years since the former edition appeared, and great advances in knowledge have been made, demanding and receiving an attention commensurate with their importance. As before, the work is solid, authoritative and well substantiated, with the additional great advantage of complete modernity.

Compendiums have always an interest of their own, enabling the student to compare the opinions and experiences of many different experts as described. They have their difficulties also, especially from the compiler's point of view; it is no easy task to assemble the work of more than two dozen contributors and achieve an integral, unified effort. This Dr. Brock has done with great efficiency. The new edition maintains the former high standard and in some respects surpasses it.

Abstracts from Current Literature

Resection of Stomach and Adjacent Organs in Continuity for Advanced Cancer.

McNeer, Gordon, & James, Arthur, *Cancer*, 1948, 1 449

The authors report the findings on 15 cases taken from the files of the Memorial hospital, New York City, that had been operated upon for gastric cancer and in which all or part of the stomach plus all or part of one or more adjacent organs were resected en mass These do not include total gastrectomy plus removal of the omentum, as that added removal is routine, nor do they include total gastrectomy alone or cardiectomy alone They also state, that of the 75 survivors of subtotal gastrectomy for cancer, three percent were alive and without recurrence for five or more years In the group of 15, seven are listed as alive and well, but of these only four have survived more than five years Brief protocols are given on these four patients, and one table is given detailing the operative procedures on all 15, the diagnosis (pathologic), the operative findings and the end result There are four photographs reproduced indicating the extent of the resection in these patients (two from one patient).

This article is similar to others that are appearing with relative infrequency emphasizing the steadily increasing daring, ingenuity and resourcefulness of the highly skilled surgeon, the unusual limits that are being extended in the attempt to cure an otherwise fatal disease They clearly state that operations of this magnitude are absolutely contraindicated except for cure, hence should never be attempted when there are demonstrable distant metastases or involvement of the fundamental blood supply As our knowledge of nutrition increases, and with the marked improvement in anesthesia, the younger surgeons of today with many years of intensive training may well advance these frontiers

W. A Chipman

Apocrine Tissue, Chronic Cystic Mastitis and Sweat Gland Carcinoma of the Breast.

John F. Higginson, John R McDonald, *Surg Gynec & Obst*, 1949, 88 1

A brief history of "pale epithelium" is presented The frequency with which this "pale epithelium" is found in surgical specimens, and the weight of evidence showing relationship of "pale epithelium" in the breast to sweat glands, to various pathologic and physiologic body states and various hormonal imbalances, stimulated the study of 97 unselected surgically removed breast In addition postmortem specimens of axillary skin from six unselected subjects were utilized The axillary glands as well as the mammary glands are apocrine, but not sweat glands—in that they are secretory in nature rather than excretory

The authors feel that the diagnosis "chronic cystic mastitis with areas of Schimmelbusch hyperplasia" which is frequently used at the Mayo Clinic, is incorrect They feel that even if Schimmelbusch did see the "pale epithelium" he did not describe it as such

On the material studied there was microscopic evidence of "pale epithelium" found in three-quarters of the specimens Macroscopically one could predict the diagnosis of "pale epithelium" in three quarters of the positive specimens by noting small pink and bluish bits of tissue and small cystic bits of tissue A positive iron reaction in the cells of the "pale epithelium" was an undeniably unique reaction Hyperplasia and papillary formation were seen together Where myoepithelial cells participate in hyperplastic activity, they appear more like epithelial cells rather than smooth muscle cells There was no great difference in the age incidence in the breast with "pale epithelium" and the breast without The hormonal imbalance of the menopause seemed to play a part Sixty five per cent of the breast with "pale epithelium," which showed papillary formation or papillary formation with hyperplasia, were in the menopausal group

In conclusion the authors state the following (1) "Pale epithelium" is actually apocrine glandular tissue identical with axillary scent glands (2) Apocrine glands are not sweat glands, but are secretory rather than excretory (3) These glands may be considered primitive epithelium responsive to hormonal stimulus (4) "Pale epithelium" is considered a normal finding in all breast after puberty. (5) The quantity increased in pathologic breast seems to substantiate the hormonal relationship

Frank S Oser, Jr

Radium Irradiation of the Nasopharynx for Hypertrophy of Lymphoid Tissue

Minchew, B H, Collins, B. E, *M. A, Georgia*, 1948, 37 439

If a careful study is made of patients complaining of earaches, deafness, tinnitus and frequent attacks of upper respiratory infections, an excessive amount of lymphoid tissue will usually be found in the nasopharynx

This tissue acts not only as a source of chronic infection, but also as an obstruction to the proper drainage and ventilation of the middle ear. Infected secretions back up into the ear. They produce a eustachian salpingitis. The mucosa of ear becomes hyperemic and edematous. The tympanic membrane retracts and thickens, and the short process becomes more prominent. Mucoid exudate organizes into granulation tissue. This contracts and becomes strands of fibrous scars that interfere permanently with movement of the ossicles.

This type of malfunctioning eustachian tube constitutes the most common cause of conductive deafness in children. By early treatment of these patients leading otologists believe that 50 percent of deafness in adults can be prevented.

It has been said that all adenoid tissue can be removed surgically. But lymphoid tissue forms an integral part of the nasopharyngeal wall. It is present in inaccessible locations such as within the edge of the eustachian tubes. Extensive surgical removal of this tissue results in scar formation and permanent closure of the orifices of the eustachian tubes. For this reason Crowe advises radium after every tonsillectomy and adenoidectomy. This removes these hidden nodules which would quickly regenerate into large masses of lymphoid tissue.

In diagnosis, one can readily see lymphoid tissue along the posterior tonsillar pillars, as well as nodules in the pharynx of the so called granular pharyngitis. The nasopharyngoscope is used to determine the amount of tissue in the nasopharynx. Audiogram studies show first a loss of hearing for the high frequencies with successively lower tone loss until the patient has noticeable hearing impairment. Rhinne tests are negative.

The Radium applicator causes no harmful effects to the patient or the physician when properly used. After nasal shrinkage and light anesthesia the applicator is passed along the floor of the nose to the posterior pharyngeal wall where it lies near the orifice of the eustachian tube. The process is repeated in each nostril for 12 minutes. The usual course is four treatments at two week intervals. Regression of the tissue is gradual and further treatment is usually not indicated. Treatments are postponed if the patient has a cold.

CLAUDE M. WARREN

Errors in the Diagnosis of Acute Appendicitis.

Recio Porffirio, *Acta med. Philippina,* 1948, 5:43.

Acute appendicitis may at times offer great difficulty in differential diagnosis. The errors may be negative or positive. An apparently normal appendix not infrequently has been sacrificed unnecessarily, whereas, on the other hand, a pathologic appendix in too many instances has caused death undiagnosed. The author stresses the fact that there is no single diagnostic procedure which will constantly and unerringly point to the appendix as the sourse of abdominal pain. All of the clinical manifestations of the disease must be remembered if one is to make a correct diagnosis. Clinical conditions which may be simulated by appendicitis must be considered and eliminated. The classic sequence of symptoms as enunciated by John B. Murphy in 1905 still holds true:

> "First, pain in the abdomen, sudden and severe, primarily referred to the epigastrium, followed by (second) nausea and vomiting, most commonly between 3 and 4 hours after the onset of pain. Third, general abdominal sensitiveness most marked in the right side and particularly over the appendix. Fourth, elevation of the temperature, from 2-24 hours after the onset of pain."

Fourteen cases selected to demonstrate difficulties in making an accurate diagnosis of acute appendicitis, and to point out errors of commission and omission in management are presented. A variety of pathologic entities ranging from ruptured corpus luteum cyst to miliary tuberculosis are discusseed. At the end of each case report short comments are given as to how the case could have been better handled.

The following observations are made regarding some of the clinical features of acute appendicitis:

(1) The pain in acute appendicitis is not colicky; it is more of a severe discomfort which sooner or later localizes at the right iliac region. There are no noncomitant symptoms of collapse and shock as in other processes such as gastric perforation or acute pancreatitis.

(2) Vomiting is not commonly seen early in uncomplicated acute appendicitis.

(3) Rebound tenderness is indicative of involvement of the parietal peritoneum. If present and corroborated by an accurate history, the diagnosis of acute appendicitis can be made.

(4) The temperature in acute uncomplicated appendicitis is not high: it is usually between 37.5° and 38.5° centigrade.

(5) Leukocytosis is rarely marked: it varies from 11,000 to 18,000 with blood count per cc.

U. G. DAILEY

Results of Partial Gastrectomy for Peptic Ulcer.

Mimpriss, T. W., and Birt, St. J. M. C., *Brit. M. J.,* 1948, 2:1095.

The 248 cases on which this report is based are from St. Thomas hospital, London. The operations were all performed for chronic gastric and duodenal ulcer, upon patients who had had no previous operations for ulcer except for the closure of a perforation. Immediate postoperative course and functional result were used in assessing the merit of each of four types of gastro-intestinal anastomosis used with partial gastrectomy The length of time since the operation ranged from one to six years, the average being 37 months Fifteen patients were not traced the operative mortality was two percent

The authors wisely avoid eponymic description of their operations the figures show the four types of operation to which reference is made, I, II and III being modifications of the Billroth II anastomosis and IV being a Billroth I gastroduodenostomy

During the immediate postoperative period, the objections found to Type I (41 operations) consisted of slow emptying into the efferent loop, to Type II, twist of the proximal (afferent) loop, in this group of 130 operations were a death from blow out of the duodenal stump and one from twisted proximal loop The patients' follow up complaints in all four types consisted of nausea, vomiting, a feeling of distention, lassitude, sweating and bouts of diarrhea Fats and fried foods tended to cause distress Twenty two percent of all the followed patients presented some of the listed complaints, which could generally be prevented by eating frequent smaller meals The authors attribute the symptoms to proximal loop filling, slow emptying of the stomach remnant, or delayed emptying of the proximal loop Two patients were believed to have a "dumping stomach" syndrome none was found to have a hypoglycemia

The follow up on the patients whose results are listed as *fair* or *bad* includes barium studies in addition to complete physical examination to exclude intercurrent abdominal disease The conclusions are that in the main "the patients who have had a partial gastrectomy for ulcer are satisfied Seventy three percent are symptom free Twenty two percent have slight symptoms which are not severe enough to make them dissatisfied, and five percent have either a poor functional result or are dissatisfied" It is felt that the results were better when the operation was done for duodenal ulcer, and that the poor results were percentage wise the same for both duodenal and gastric ulcer

That so many of the patients who had the authors' type II operation were satisfied with what seemed to be a less than satisfactory functional result is ascribed to the fact that most of these patients had had large, chronic and very troublesome ulcers, and were hence more tolerant of post operative functional disturbances "With the exception of anastomosis of the afferent loop to the greater 'curvature, ante colic,' which leads to a high incidence of proximal loop filling, there is nothing to choose between the functional results of the other three anastomoses employed"

LOUIS RIVERS

Rapid Disinfection of Clean Unwashed Skin A D Gardner, *Lancet*, 1948, 2 760

"The rapid disinfection of unwashed skin, experimentally infected with bacteria, has been investigated in a previous inquiry, which showed that two percent iodine in 70 percent alcohol, disinfected more rapidly than any of the other substances tested (Gardner and Seddon 1946) Further experiments on the same lines are described here"

About a dozen circular areas, one in in diameter on the shaven but not especially washed skin of the forearm were successively infected and disinfected The areas were swabbed with bacterial suspension of known density, and when dry were treated with the disinfectant for a given time either by swab application or with discs of sterile lint soaked in the disinfectant was included in the experiment

Agar plate cultures were then obtained The controls must give a semi confluent growth or at least densely set colonies of 50 000 or more, and a test plate of less than six colonies is considered virtually disinfected Skin spore infection is disregarded

In most experiments, *Ps pyocyanea* was used since this bacteria is at least as resistant as cocci

The effectiveness of zephiran, cetrimide, ethyl ether, chloros, various preparations of mercury, and other substances were studied It was found that the power of two percent iodine in 70 percent alcohol virtually disinfected flat areas of unwashed skin in one half minute or less, and when a full 30 seconds was allowed, the iodine could be reduced to 0 5 percent

The detergents, zephiran 30 percent, and cetrimide 10 percent, both in ethyl alcohol give satisfactory disinfection in 30 45 seconds

The application of two percent iodine in alcohol is an extremely rapid and effective means of sterilizing the unwashed skin in preparation for emergency incisions

D J LEITHAUSER

Colectomy Skinner, Homer L and Smith, Robert R, *Am J Surg*, 1949, 77 38

A brief historical review of rectal and colon surgery is presented During the past ten years, colon and rectal surgery has advanced in safety At the Lahey Clinic the respectability rate for carcinoma of the colon and rectum increased from 50 percent in 1928 to 89 9 percent in 1938, with a lowering of mortality from 36 percent in 1928 to 10 percent in 1938, and 3.8 percent in the period from 1941 to 1946

While cancer is the most frequent and most important indication for colon surgery, the gre safety margin has made surgery available in more benign lesions.

The pathologic, physiology and medical management of congenital megacolon are reviewed. The case of a 19-year-old white male who, since birth had obtained bowel evacuation by frequent rectal irrigations is presented. He had received all sorts of medicine, massage, electrical treatments and even chiropractic. In 1941 a right sympathectomy was done and in 1942 a left sympathectomy was done with no change in bowel function.

A colectomy was done with a side-to-side anastomosis between the ileum and sigmoid and the open end of the sigmoid was brought out through the incision. The colostomy was closed 52 days later. Six months later he was having normal daily bowel movements and maintaining normal weight.

The differential diagnosis, classification and various stages of chronic ulcerative colitis are discussed.

It is stated that surgical treatment may be divided into three categories:

1. Emergency. During an acute exacerbation of ulcerative colitis an ileostomy may be necessary because of sepsis and emaciation.
2. Curative. When extensive irreversible changes have occurred in the colon, resection is indicated.
3. Treatment of malignancy. One must be ever alert for malignant change since this complication is more common than previously reported.

The case of a 42-year-old white male is presented. He was admitted to the clinic complaining of nine to 18 stools containing pus and blood daily. This had been present for six weeks.

When after eight weeks of medical management, fever, diarrhea, abdominal pain, and emaciation continued an ileostomy was done. Fourteen months later, since there was no improvement in the appearance of the colon, the terminal ileum and right colon were resected. The specimen showed longitudinal ridges of grey granulation in the mucosa, which was studded with tiny polyps. Two months later the remaining colon was resected, down to the sigmoid.

Six months later, two years after the onset of the disease the sigmoid and rectum were removed by abdominoperineal resection because of purulent drainage from the rectum and inability to gain weight. Three months later he resumed his work as a seaman.

Polyposis of the colon, first described by Virchow in 1863, is a relatively rare disease. Up to 1942 only 331 cases had been reported. At Mayo Clinic four percent of patients examined in the proctological section had one or more polyps, but only 0.04 percent had disseminated polyposis. It is found at autopsy in one-third of those who have died of cancer of the colon or rectum.

The disease is classified as: (1) Adult or acquired type, characterized by a long history of colitis. (2) Adolescent of congentital type, where there is a distinct familial history. The incidence of malignant degeneration in both types is very high (34.6 to 50 percent). Probably all patients with diffuse polyposis will develop cancer of the bowel if they live long enough.

The treatment is entirely surgical and with present day methods is now quite safe (6.9 percent mortality).

The case of a 46-year-old white male whose father, mother, uncle, two aunts and a grandmother all died of cancer is presented. During childhood he had dysentery and stated that during the past 20 years there had been frequent episodes of bloody diarrhea. Sigmoidoscopic revealed no evidence of polyps in the terminal sigmoid or rectum. Barium enema showed a generalized honeycombing appearance of the distal two-thirds of the colon and a large filling defect in the lower one-half of the descending colon.

The left colon was resected and an ileosigmoidostomy, a transverse colostomy and a sigmoidostomy were etablished. The pathologic diagnosis was papillomatosis of the colon and adenocarcinoma of the sigmoid. Ten weeks later the remainder of the right colon was resected, leaving the patient with an ileosigmoidostomy and a sigmoid colostomy. Four weeks later the colostomy was closed extraperitoneally. Twenty months later the patient was asymptomatic, having normal stools and barium studies showed a functioning enterostomy with no evidence of neoplasm.

Victor T. Hudson

Calcified Cyst of Spleen. John H. Donovan, *Brit. M. J.*, 1948, 2:1106.

Donovan stated that his is the seventh case of calcified splenic cyst recorded in medical literature. The patient was a spinster aged 50 who complained of vague and intermittent attacks of abdominal pain, nausea and vomiting. The condition was suspected after a routine barium meal examination disclosed a shadow.

A transthoracic operation was done and the lung partially collapsed when the cyst pushed the diaphragm upward. The diaphragm was opened, adhesions to the stomach freed, and the tumor removed. An uneventful recovery followed.

Leigh F. Watson

Armamentarium

New Aureomycin Injectable Announced by Lederle: The Lederle Laboratories have recently brought out a preparation of sureomycin hydrochloride for intravenous use in emergencies or for patients unable to take oral medication, e.g., after operations on the gastrointestinal tract. The package contains one vial of 100 mg. of aureomycin hydrochloride powder and one 10 cc. vial of leucine diluent to make a solution containing 10 mg. of aureomycin hydrochloride per cubic centimeter. Administered intravenously, this solution is said to achieve a high blood level of aureomycin with a minimum of delay.

Flame Photometer Determines Potassium Level: A new instrument, manufactured by the Perkin Elmer Corporation of Glenbrook, Connecticut, and known as the flame photometer, is alleged to determine the potassium content of body fluids in less than half an hour, thus making it possible to save lives that would otherwise be lost. The instrument is a gas burner, into the base of which the solution to be analyzed is introduced in the form of a fine mist. Each solution gives the flame a characteristic color. Light from the flame then passes through a monochromator, which isolates that part of the light which is characteristic of potassium. The intensity of the light, which is measured by a photoelectric tube, is the measure of the amount of potassium present. The instrument may also be used to analyze solutions for other chemical elements, such as sodium, calcium and manganese.

Compact Chemical Feeder: The "Feed-Rator," a new chemical feeder introduced by the Fischer & Porter Company of Hatboro, Pennsylvania, is now on the market. Constructed of transparent acrylic plastic and measuring approximately 10x5x2 inches overall, this unit simultaneously controls, measures and dispenses relatively small amounts of bactericides, catalysts, disinfectants, fungicides, inhibitors, reagents and other chemicals into a larger stream. The built in eductor takes the place of a pump, and many highly corrosive chemicals can therefore be fed directly from a container. The unit will treat up to 7,000 gallons per day of water directly. In a bypass arrangement, with use of a solution containing 5 per cent active reagent (by weight), 5 parts per million of the reagent can be delivered to over 14,000,000 gallons of water per day.

New Development in Microscopy: An important aid to cancer research is announced by the research laboratories of the American Optical Company of Southbridge, Massachusetts. It consists of a newly designed reflecting system and is adaptable to other scientific purposes as well as to the detection of cancer. The system utilizes both the visible and the invisible regions of the spectrum, particularly untraviolet and infrared. All wave lengths of the spectrum are brought into the same focus. Experimental samples are now in research use at the Massachusetts Institute of Technology and Columbia University, and plans to manufacture the new objectives are being made at the American Optical Company's instrument division in Buffalo, New York.

Clinical Spectrophotometer Aids in Detection of Diabetes: The Coleman model 6 spectrophotometer, obtainable from the Burrell Corporation of Pittsburgh, was used in conjunction with an adaptation of the Folin-Malmros Micro Blood Sugar Method in a diabetes detection drive conducted by the Commission for Diabetes of the Medical Society of the State of Pennsylvania. More than 275 doctors attending the Pennsylvania Medical Convention were tested. Details of the mass testing technic employed are obtainable from the Burrell Corporation on request.

Physicians' Service: The Thomas Pearce Company of Wilmington, Delaware, offers a new business service exclusively to physicians. It consists of a simplified bookkeeping record with a year's supply of forms and includes a free estimation, by the company's experts, of the subscribing physician's income tax.

Skeletal Muscle Relaxant: "Syncurine" brand decamethonium bromide (C 10) injection, presented by Burroughs, Wellcome & Co. of Tuckahoe, New York, is a new sterile, isotonic stable solution containing 2 mg. of decamethonium bromide (C 10) per cubic centimeter. Given intravenously, this preparation is a powerful skeletal muscle relaxant and if of therapeutic value as an adjunct to surgical anesthesia, as well as for lessening the violence of muscular contractions in electric shock therapy. It has a relatively short action and therefore, according to its sponsors, more controllable than histamine and not conducive to such side effects as bronchospasm or fall in blood pressure.

In Memoriam

EDWARD J. PANZER

M.D., F.A.C.S., F.I.C.S.

Dr. Edward J. Panzer, prominently known as he "dean of Detroit surgeons," passed away Oct. 0, 1949, at the age of 73. A graduate of the old etroit College of Medicine in 1893, Dr. Panzer racticed for fifty-four years in his home town, here he was respected as a skillful surgeon and a reat humanitarian. Dr. Panzer was attending and onsulting surgeon at Providence hospital for hirty-four years and for several years he was chief f staff. He also was consulting surgeon at Holy ross hospital and a member of the staff of Grace ospital. He aided in the establishment of the amaritan Hospital, predecessor of St. Joseph's ercy hospital. Dr. Panzer was a member of the Wayne County Medical Society, the Michigan tate Medical Society. In 1915 he was elected as Fellow to the American College of Surgeons.

MAXIMILLIAN J. SEIDNER

M.D., F.A.C.S., F.I.C.S.

Dr. Maximillian J. Seidner of Ogden, Utah, died recently at the age of 55. Dr. Seidner received his academic training at the Lewis Institute of Chicago, and graduated from Loyola University School of Medicine in 1917. He resumed his studies, taking postgraduate work at the University of Vienna in 1930, and returned to Europe in 1936, at which time he studied at the University of London and again at the University of Vienna. Dr. Seidner served his internship at the Thomas Dee Memorial Hospital, Ogden, where he later became chairman of it surgical staff in 1937. Dr. Seidner was also on the senior surgical staff at St. Benedict's hospital and consultant in surgery at the Utah State Tuberculosis Sanitarium. Clinical lecturer in surgery at the University of Utah School of Medicine, he also taught at the School of Nursing at the Thomas Dee Memorial Hospital. Dr. Seidner was an active member of the Utah State Medical Society and Weber County Medical Society.

RALPH W. SCHAEFFER

M.D., F.I.C.S.

. Dr. Ralph W. Schaeffer, aged 55, recently passed away at his home in Redondo Beach, Calif. A graduate of Cornell University School of Medicine, Dr. Schaeffer majored in abdominal surgery and later became chief of surgery at Torrance Memorial Hospital, Torrance, Calif.

RUDOLPH WALTER ROETHKE

M.D., F.I.C.S.

Dr. Rudolph Walter Roethke, Milwaukee, Wis., recently died at the age of 65. He received his medical training at the University of Pennsylvania and graduated in 1910. An outstanding surgeon in the field of Obstetrics and Gynecology, Dr. Roethke was affiliated with the following hospitals in Milwaukee: the Emergency Hospital, the Milwaukee Maternity Hospital, Mt. Sinai Hospital, St. Mary's Hospital and the Columbia Hospital. He was on the staff at Marquette School of Medicine from 1913 to 1919 as professor of Obstetrics and Gynecology. In 1943, when he was chosen president of the Wisconsin Academy of Surgery, was also active in the Milwaukee Society of Clinical Surgery.

DONAT F. MONACO

M.D., F.A.C.S., F.I.C.S.

Dr. Donat F. Monaco of Gallup, New Mexico, aged 53, passed away Sept. 12, 1949. Dr. Monaco, born in Brooklyn, N. Y., received his medical degree in Chicago at Loyola University School of Medicine, 1917, and served his internship at Lakeside hospital Chicago. Dr. Monaco later settled in Gallup, where he was senior surgeon at St. Mary's hospital from 1937 to 1947. Active in medical organizations, he was vice president of the New Mexico State Medical Society and of the McKinley Medical Society.

COLLEGE INTERNATIONAL DES CHIRURGIENS

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Original Articles

Reversal of Biochemical Processes in Cases of Cochlear and Vestibular Dysfunction

SAMUEL J. KOPETZKY, M.D., F.A.C.S.*
NEW YORK

MEDICAL science advances not so much by the discovery of previously unknown facts as by the logical coordination of facts and factors that may be either old or entirely new. When the logically coordinated application of either old or newly discovered factors is found to fill an existing gap in scientific knowledge, it usually becomes evident that some unsolved problem in clinical practice has advanced toward solution.

In this study of deafness and vertigo a series of clinical cases is described, with particular stress on the biochemical blood values as indicators of biochemical physiologic dysfunction. It is proposed to demonstrate how hypercholesterolemia and hyperpyruvemia hold the key to comprehension of the factors at fault in dysfunction of the cochlear and vestibular mechanisms. The same observations will show how, in the case of very young infants, these factors fill the gap in professional knowledge concerning the development of the hereditary factor in congenital deafness (deafmutism), and they will also afford a logical explanation as to how the hereditary factor is so activated as to result in deafness in children of school age who have survived a severe systemic illness. This type of deafness is usually brought to attention by school authorities and, subsequently, by otologic examinations.

At the present stage of knowledge, the known and generally accepted concepts may be sketched as follows:

1. *The anatomic concept of the diverse distribution of nerve fibers of the sympathetic and parasympathetic divisions of the autonomic nervous system.* With regard to the problems that concern this presentation, the autonomic nerve connections that partly control the functions of the pituitary gland (and also, to some extent, the functions of the thyroid and parathyroid glands and those of the thoracic and abdominal viscera and the endocrine glands) are to be noted.

As regards vertigo particularly, the nerve tracts from the skeletal musculature and from the vestibular portion of the inner ear, run ning centrally to coordinating centers in the cerebellum and from there to the thalamus (the area of unconscious cerebration) to cortical cerebral centers, also contribute known anatomic items for consideration.

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*Professor of Otolaryngology and Director of Department, New York Polyclinic Medical School and Hospital.

From the Department of Otolaryngology.

Read at the Fourteenth Annual Assembly of the United States Chapter, International College of Surgeons, Atlantic City, November 1949.

2. *The physiologic concept of the neuroglandular mechanisms of the hypophysis, particularly those of the anterior lobe of the pituitary gland and the nervous structures of the hypothalamus.* This area[1] contains centers regulating vital and fundamental processes; e.g., the metabolism of carbohydrates, fats and water. In the hypothalamus and its tubal area are located centers that govern the autonomic nervous system. Physiologists believe that these constitute a parasympathetic center. In the posterior portion of the gland are situated cells that are held to exert a directing influence over the sympathetic nervous system. The interplay of the parasympathetic and sympathetic neuromechanisms results at the respective nerve terminals either in a cholinergic or in an adrenergic effect.

3. *The well known and generally accepted concept of the biochemical mechanisms* involved in oxygen uptake in the essential steps of phosphorylation in the metabolism of carbohydrate, and protein bonds in the various stages of the metabolism of fats and lipoids.

4. *The clinical concept of the part played by the Mendelian law in the heredity of deafness.* There are authentic records of families in which deafness apparently is a family heritage. Likewise, there are authentic case records of persons with such a heritage in which there is evidence that after a severe systemic bacterial infection, immediately after the onset of puberty, during pregnancy (especially the second pregnancy) or after the onset of the menopause in women or its analogue in men, dysfunctions in the cochlear and vestibular mechanisms become clinical entities.

5. *The pathologic concepts through which physicians have generally accepted knowledge* of the long list of diseases, particularly arteriosclerosis, and also most of the so-called deficiency diseases—von Recklinghausen's disease, rickets, Paget's disease, osteoporosis, osteodystrophia fibrosa, chondrodystrophy, osteogenesis imperfecta and otosclerosis[2]—in which osseous pathologic change at the otic capsule has been demonstrated. Dwarfism and other endocrinopathic conditions also are associated with large numbers of osseous lesions, both in the skeletal bones and in the otic capsule. By and large, the endocrinopathies affect the pituitary gland, the thyroid gland and the parathyroid glands. The adrenal and the gonadal glands may also be involved.[3]

The foregoing five paragraphs outline the most important known factors with which this study is concerned. To these may be added the more recently acquired knowledge of the physiologic activities of the various enzymes and co-enzymes, and of their synthesis and disintegration under the interplay of traumatic antagonistic sympathetic and parasympathetic activity, including the role played by vitamins and hormones. If these reactions and their results are correlated with the results of laboratory experiments performed on animals fed avitamized diets,[4] an existing gap in knowledge is apparent. The clinical problems inherent in deafness remain unsolved.

When the physiologic nature of the enzymatic processes and their relations to function and dysfunction in the cochlear and vestibular systems were first comprehended, the circulating blood was thought to contain not only an index to the status of the enzymatic mechanism but a measure that might be used in prognosis with regard to the abnormalities presented by the defective enzymatic process.

A study of the biochemical blood values in cases of deafness was therefore undertaken. The information obtained from pathologic values in 581 cases appears to bridge a gap in professional knowledge as to how and why the cochlear and vestibular dysfunction occurs, by indicating a biochemical pathologic condition of the blood. It also indicates a means by which the therapist can prevent further deterioration of cochlear and vestibular function by causing a reversal of the chemical processes. Furthermore, as the cases to be presented will demonstrate, in many instances it offers a means of improving the physiologic activity of the mechanisms concerned in the acoustic and equilibrial dysfunctions presented by the patient, resulting in better hearing acuity and a more stable equilibrium.

Figure 1 represents a general summation of the cases described in this study.

Obviously, in a series of 581 case studies, in

461 of which biochemical examinations of the blood were made, it is impossible to present a major number of the cases in detail. Besides, statistical reports have little scientific value in the case of any given patient because it is absolutely impossible to predict that the particular patient will or will not respond to the promulgated therapy. This is because so many causes far beyond the scope of the cochlear and vestibular mechanisms contribute the actual factors at fault in the specific dysfunctions presented. Although it is not necessarily true in every instance, in many such cases there results an analogous clinical picture of deafness and vertigo. The symptoms of dysfunction of the cochlear and vestibular apparatus here occur as secondary effects of the defective chemical processes inherent in the primary disease.

A summation, therefore, of the total number of deafened patients submitted to therapy and of the number improved, unimproved or worse is of no scientific value. Such a compilation would involve unlike conditions because the spread of enzymatic dysfunction covers too wide a physical field to be put into exactly and scientifically defined groups. It must also be understood that for physiologic function there is a relation between sets of cholinergic and adrenergic biochemical processes so that when one set is in a state of imbalance the others do not function at the optimal physiologic level. This also creates differences that cannot be compared. In other words, deafness and vertigo arise from sources that are often not in direct relation to the ear and its functions. A few examples may be cited.

Case 1. H. F., who suffered from an undiagnosed, largely asymptomatic carcinoma of the stomach, presented a set of predominant symptoms including deafness, severe tinnitus and vertigo. The gastric cancer induced the dysfunction, which resulted in the demonstration of hypercholesterolemia and hyperpyruvemia on chemical examination of the blood.* At first the patient presented no symptoms

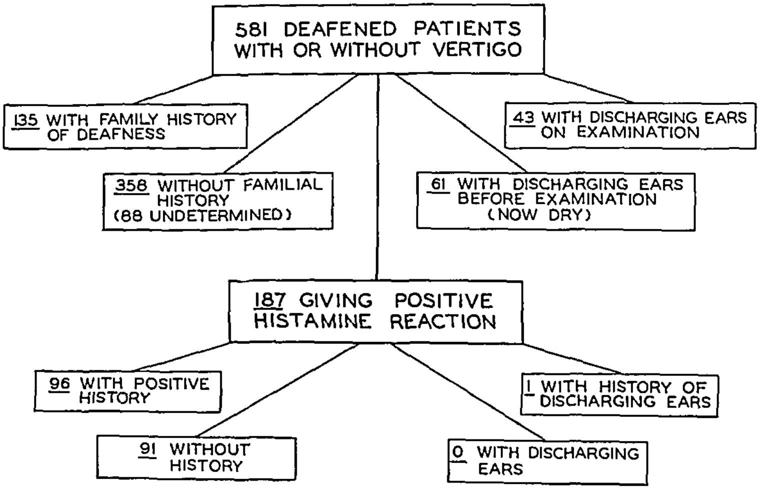
581 DEAFENED PATIENTS WITH OR WITHOUT VERTIGO
135 WITH FAMILY HISTORY OF DEAFNESS
358 WITHOUT FAMILIAL HISTORY (88 UNDETERMINED)
61 WITH DISCHARGING EARS BEFORE EXAMINATION (NOW DRY)
43 WITH DISCHARGING EARS ON EXAMINATION
187 GIVING POSITIVE HISTAMINE REACTION
96 WITH POSITIVE HISTORY
91 WITHOUT HISTORY
0 WITH DISCHARGING EARS
1 WITH HISTORY OF DISCHARGING EARS

Fig. 1.—Diagram of study presented in this paper

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*Strangely and hyper
pyruvemia ar afflicted with
malignant di uration of
malignant t acid present
denoting a lie tancy having
been suspecte dered only is
they affected echanisms

TABLE 1.—*Hearing Losses in Case 1*

Date	Whole range loss, %		Speech range loss, %		Binaural loss, %	Condition of ossicles	
	Right ear	Left ear	Right ear	Left ear		Right ear	Left ear
7/9/46	38	53	36	44	35.4	Mobile	Mobile
9/6/46	40	46	35	40	31.9	Mobile	Mobile
10/17/46	41	51	36	41	36.5	Mobile	Mobile
12/10/46	40	50	33	40	31.5**	Mobile	Mobile
1/22/47	42	51	37	44	41.0	Mobile	Mobile
3/19/47	40	50	33	43	33.7	Mobile	Mobile
4/23/47	41	50	34	43	35.8	Mobile	Mobile
6/4/47	41	48	34	42	34.8	Mobile	Mobile
9/1/47	42	49	33	44	34	Mobile	Mobile

**Tinnitus considerably lessened. This was the maximum gain; thereafter the patient showed rapid loss of weight and general deterioration, followed by death due to cancer.

TABLE 2.—*Biochemical Hematologic Values in Case 1*

Constituent*	Normal value	Value in Case 1 7/17/46	Value in Case 1 10/18/46	Value in Case 1 12/5/46	Value in Case 1 1/22/47
WB—Urea N	12–15	12.6	18.0	14.7	14.3
WB—Uric acid	2.5–3.5	1.3	2.55	2.4	2.3
WB—Sugar	80–120	85.0	75.0	95.0	100.2
BS—Cholesterol	160–200	222.5	250.0	305.0	305.0
BS—Phosphorus					
BS—Calcium	9–11	9.4	11.0	10.0	9.6
BS—Carotene	115–122	128.2	125.0	122.4	124.1
BS—Vitamin A	70–197	89.6	101.5	85.4	110.1
BP—Vitamin B_1	0.6	0.906	0.816	0.776	0.986
BP—Vitamin C	0.8–2.4	1.41	1.11	1.64	1.73
BS—Total protein %	6.5–8.2	7.18	6.24	7.26	7.5
BS—Albumin %	4.6–6.7	5.10	4.80	4.99	5.8
BS—Globulin %	1.2–2.3	2.08	1.44	1.25	1.7

*In this and in all succeeding tables, of hematologic values, the abbreviations used are as follows: Urea N, urea nitrogen; WB, whole blood; BS, blood serum, BP, blood plasma.

except those concerned with the cochlear and vestibular mechanisms. These symptoms were so marked that the patient had been hospitalized for a checkup study to establish or rule out the presence of a tumor of the pontine angle. No such tumor was found, and the patient came under my observation.

The hearing losses are shown in Table 1. The hearing improved during the first five months of treatment. Thereafter deterioration set in, with rapid loss of weight and symptoms referable to the gastrointestinal tract. An exploratory laparotomy was done, and carcinoma of the stomach was discovered. The patient survived operation but died of the malignant neoplasm within a few months. It is interesting to note the results of successive biochemical examinations of the blood (Table 2).

The gastric cancer defeated therapy based upon efforts to correct the biochemical blood values as they were on July 17, 1946, at which time hypercholesterolemia and hyperpyruvemia were evident. The progressive evolution of the malignant tumor in the gastrointestinal tract impaired the intermediate carbohydrate metabolism in its phosphorylation mechanism. As may be noted from Table 2, successive studies of the blood demonstrated an increase of the hypercholesterolemia despite therapy. The increased hypercholesterolemia coincided with

TABLE 3 *Hearing Losses in Case 2*

Date	Whole range loss %		Speech range loss %		Binaural loss %	Condition of ossicles	
	Right ear	Left ear	Right ear	Left ear		Right ear	Left ear
1/24/49	23	21	12	11	2 2	Mobile	Mobile
4/1/49	19	20	9	12	2 1	Mobile	Mobile
5/9/49	19	22	9	15	2 0	Mobile	Mobile
6/6/49	17	19	9	12	1 6	Mobile	Mobile
7/6/49	15	17	8	11	1 0	Mobile	Mobile

increases in hearing loss (Table 2) There was also a deficiency in the diphosphothiamine magnesium protein item of the vitamin B group as indicated by the presence of hyperpyruvemia

The cochlear and vestibular symptoms were the result of these faulty enzymatic systems dysfunction—they were actually a secondary effect As long as the enzymatic dysfunction persisted because of the malignant neoplasm no therapy was available to effect a reversal of the biochemical processes It must be obvious that such a case and the therapy applied therein should not be classified with cases of cochlear and vestibular dysfunction due to otosclerosis

Case 2 M D, aged 38, consulted me for an annoying tinnitus that kept him from sleeping His clinical history revealed that he had had severe hypertension with blood pressure readings of 220 systolic and 130 diastolic, for relief of which he had undergone sympathectomy one year previously This patient was *totally unconscious* of any hearing loss There was no history of familial deafness, no prolonged bone conduction, and no lifting of the lower tone limit in either ear The ossicular chains were mobile The hearing losses are summarized in Table 3

There have been distinct improvements in this patient's hearing The biochemical blood values are shown in Table 4 Here too, the deafness, which *resulted from factors due to arteriosclerosis*, is an argument against putting all cases in one category [5]

In this case the deafness was not of long duration Hearing loss was above the level of 30 decibels, hence the patient's unawareness of his hearing disability is comprehensible His prompt response to therapy also bespeaks the recent onset of cochlear functional deterioration Sympathectomy relieved his vascular tension and eased his cardiac function but the general vascular disease that brought about quantitative changes in the wonted physiologic metabolism of fats (being in this case, as in most such cases of vascular disease a metabolic dysfunction incidental to faulty carbohydrate metabolism) *needed medical therapy specifically aimed to cause a reversal of the chemical processes* and bring the faulty carbohydrate metabolism to a halt In this case with both hypercholesterolemia and hyperpyruvemia present the improved hearing acuity demonstrated by audiometric tests and tuning fork tests indicates that the reversal is being accomplished

Case 3 M D, aged 43, had noted loss of hearing for one year, there was no tinnitus and no familial history of deafness The patient had diabetes and alleged that he had ulcers of the stomach He did not remember any childhood illnesses He had never had discharging ears He had but few colds and no dizzy spells

TABLE 4 —*Biochemical Hematologic Values in Case 2*

Constituent	Normal value	Value in Case 2
W B—Urea N	12 15	15 9
W B—Uric acid	2 5 3 5	5 9
W B—Sugar	80 120	92 5
BS—Cholesterol	160-200	250 0
BS—Phosphorus	2 5-4 0	4 05
BS—Calcium	9 11	10 3
BS—Carotene	115-122	120 8
BS—Vitamin A	70-197	97 6
BP—Vitamin B_1	0 6	0 816
BP—Vitamin C	0 8-2 4	1 08
BS—Total protein	6 5 8 2	6 0
BS—Albumin %	4 6-6 7	4 1
BS—Globulin %	1 2 2 3	1 9

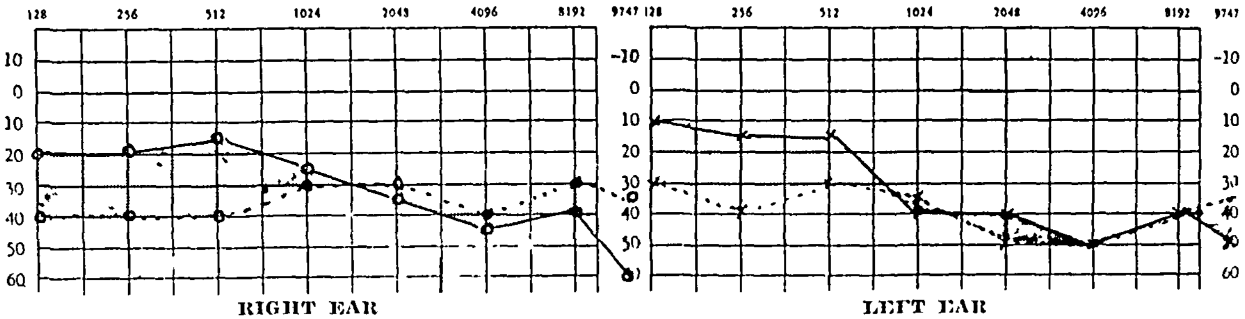


Fig 2.—Case of M D, aged 13, as observed from November 1948 to June 1949. Solid line, first test; dotted line, last test; shaded area, gain in decibels.

TABLE 5.—*Hearing Losses in Case 3*

Date	Whole range loss, %		Speech range loss, %		Binaural loss, %	Condition of ossicles	
	Right ear	Left ear	Right ear	Left ear		Right ear	Left ear
11/8/48	29	28	20	25	21.7	Movable	Movable
2/18/49	24	26	16	24	20	Movable	Movable
6/24/49	32	34	27	31	24.8	Movable	Movable

Physical examination revealed a small spur at the left side of the nasal septum. The tonsils had been removed previously. The pharynx was clean. In the right ear, the whole drum and the ossicles were movable and the canal normal in diameter. The vascular reflex was slow, and the drum was slightly indurated. The left ear showed the same conditions. The results of audiometric hearing tests are charted in Figure 2 and summarized in Table 5. Bone conduction under conditions of masking gave responses only to the 512 and 1024 frequency bands. Fork tests showed shortened bone conduction in both ears and no prolonged bone conduction.

TABLE 6.—*Biochemical Hematologic Values in Case 3*

Constituent	Normal value	Value in Case 3
WB—Urea N	12–15	14.2
WB—Uric acid	2.5–3.5	3.7
WB—Sugar	80–120	177.5
BS—Cholesterol	160–200	290.0
BS—Phosphorus	2.5–4.0	2.04
BS—Calcium	9–11	10.95
BS—Carotene	115–122	119.8
BS—Vitamin A	70–197	96.0
BP—Vitamin B_1	0.6	0.8
BP—Vitamin C .	0.8–2.4	1.5
BS—Total protein %	6.5–8.2	6.75
BS—Albumin %	4.6–6.7	4.74
BS—Globulin %	1.2–2.3	2.01

The results of biochemical examination of the blood are shown in Table 6.

The presence of hypercholesterolemia is significant, since the dysfunction in the mechanism of storage and delivery of sugars to the tissues is similar in some elements to the abnormality in carbohydrate utilization observed in the other cases in this group. Four different diseases and conditions are involved, but in each a dysfunction in metabolism produced a *secondary effect* on the cochlear and vestibular mechanisms, resulting in symptoms of deafness, tinnitus and vertigo.

Case 4: L. K., aged 14 years, had suffered a severe attack of mumps one year prior to examination. Since then the hearing in the left ear had deteriorated. There was also severe tinnitus, heard only in the left ear. There was a positive familial history of deafness, the patient's aunt (mother's sister) being deafened. The patient had never had a discharge from the ears.

Functional tests, both audiometric and by tuning fork, revealed a mixed type of deafness—perception and conduction type—with a raised lower tone limit above the 64 double vibration level in the left ear only. There was no prolonged bone conduction. An audiometric charting of the first test

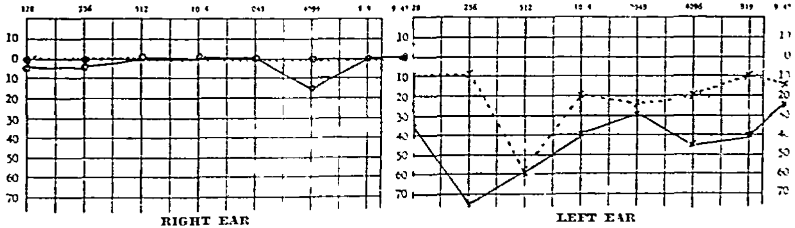


Fig 3—Case of L. K., aged 14 as observed from May 1943 to June 1949 Solid line, first test, dotted line last test shaded area gain in decibels

and one of the more recent tests is shown in Figure 3.

The blood chemical values are summarized in Table 7. A mild degree of hypercholesterolemia was present, with a marked degree of hyperpyruvemia There was a low sugar content An imbalance in the protein albumin ratio was noted

Toxins from the mumps had definitely attacked the eighth nerve. This was demonstrated by tuning fork tests and audiometric bone conduction tests under conditions of masking

Medication aimed at reversal of the chemical processes at fault was effective, as Figure 3 indicates. One band of frequency cycles (that of 512 cycles per second) was the only one that failed to show improved function in response to the therapy, which was specifically aimed to reestablish control over the *cholinesterase factor at fault,* which handicapped the chemical mediator—the acetylcholine item necessary to convert the energy of a sound wave pattern at the end organ of the acoustic nerve and along its nerve pathways passing centrally, particularly at their various synapses.

From the 4 cases thus far cited it must be evident *that statistics based upon deafness and upon hearing loss in decibels,* handled as *one group* and submitted to either medical or surgical therapy, have no real scientific value, because it is impossible completely to define the various groups of conditions, diseases, sequelae of previous illnesses, etc., all of which have affected the cochlear and vestibular mechanisms

Therefore, in what follows no attempt is made at a statistical summation of the results of the administered therapy upon deafness, upon tinnitus, or upon vertigo *per se,* because these are not diseases They are symptoms arising from many diseases and conditions, including some of psychosomatic origin.

Case 5 H. E., a man aged 55, stated that every time he swallowed he had a sensation of "pull" in his ears, accompanied by tinnitus, which he described as a ringing sound. He had no dizzy spells, and there was no family history of deafness. He had never had hay fever. He had been given a special diet because of excessive weight in 1947 and had lost 20 pounds (9.1 Kg.) over a period of three years

Physical examination revealed a very mild deflection of the nasal septum to the left and some degree of hypertrophic ethmoiditis Tonsillectomy had been performed, but some tissue remained. There was granular pharyngitis. The drum of the right ear was slightly indurated. The vascular reflex was prompt. The canal was not enlarged, and the ossicular chain was mobile Similar conditions prevailed in the left ear. Both eustachian tubes were patent Tests for histamine sensitivity gave negative results. Table 8 sums up the data obtained on functional examination. The initial and latest audiographic results are charted in Figure 4

TABLE 7—*Biochemical Hematologic Values in Case 4*

Constituent	Normal value	Value in Case 4
WB—Urea N	12-15	13.0
WB—Uric acid	2.5-3.5	1.5
WB—Sugar	80-120	62.5
BS—Cholesterol	160-200	207.5
BS—Calcium	9-11	10.0
BS—Carotene	115-122	117.8
BS—Vitamin A	70-197	93.6
BP—Vitamin B_1	0.6	0.826
BP—Vitamin C	0.8-2.4	1.249
BS—Total protein %	6.5-8.2	7.8
BS—Albumin %	4.6-6.7	5.6
BS—Globulin %	1.2-2.3	2.2

TABLE 8.—*Hearing Losses in Case 5*

Date	Whole range loss, %		Speech range loss, %		Binaural loss, %	Condition of ossicles	
	Right ear	Left ear	Right ear	Left ear		Right ear	Left ear
6/10/48	43	38	28	30	34 9	Mobile	Mobile
7/30/48	32	29	20	17	25 3	Mobile	Mobile
9/ 3/48	28	26	15	16	16 7	Mobile	Mobile
10/ 9/48	25	24	15	16	17 0	Mobile	Mobile
11/ 1/48	20	24	12	16	11 7	Mobile	Mobile
12/13/48	19	23	11	15	11 4	Mobile	Mobile
2/21/49	17	23	9	11	10 7	Mobile	Mobile
7/ 8/49	16	20	9	11	10 7	Mobile	Mobile

TABLE 9.—*Biochemical Hematologic Values in Case 5*

Constituent	Normal value	Value in Case 5, June 1948	Value in Case 5, June 1949
WB—Urea N	12–15	16 7	16 7
WB—Uric acid	2 5–3 5	4 8	4 4
WB—Sugar	80–120	127 5	126
BS—Cholesterol	160–200	207 5	280 0
BS—Phosphorus	2 5–4 0	4 62	5 23
BS—Calcium	9–11	10 4	9 4
BS—Carotene	115–122	115	116 4
BS—Vitamin A	70–197	103 5	98 6
BP—Vitamin B_1	0 6	0 656	0 816
BP—Vitamin C	0 8–2 4	0 659	1 37
BS—Total protein	6 5–8 2	6 75	6 75
BS—Albumin %	4 6–6 7	5 25	3 95
BS—Globulin %	1 2–2 3	1 5	2 80

Bone conduction tests under conditions of masking revealed islands of nerve deafness in the frequency bands of 2048, 4096 and 8192 cycles per second.

The results of biochemical examination of the blood are shown in Table 9. They indicate a mild degree of hypercholesterolemia, and a slight excess of pyruvic acid was noted in the first examination. This prognosticated improvement if reversal of the chemical processes at fault were brought about by corrective therapy. The results justified this prognosis at the end of approximately one year. Recently, however (1949), the patient reported sensations of uneasiness in equilibrium. A second examination of the blood was undertaken, despite the excellent hearing results shown by functional hearing tests taken at the same time of the year. The second examination revealed, among other things, an increase in hypercholesterolemia and hyperpyruvemia. Changes in therapy have been instituted toward further reversal of the abnormal chemical processes.

Case 6 offers a contrast to those just reported.

Case 6: Mrs. L. M., aged 30, in August 1947 felt a sensation of fullness in both ears and had an attack of dizziness. She lay down and the sensation

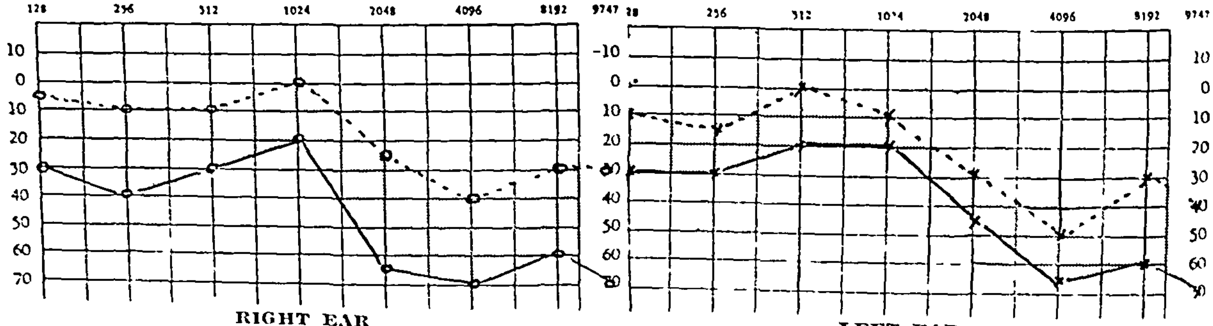


Fig 4—Case of H E, aged 55, as observed from June 1948 to July 1949 Solid line, first test, dotted line, last test, shaded area, gain in decibels

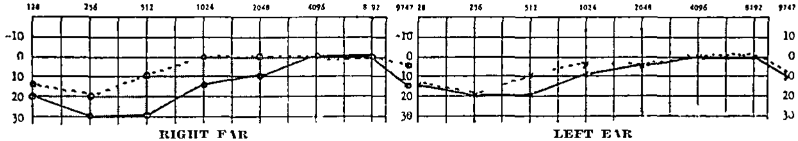


Fig 5—Case of I M aged 30 as observed from December 1941 to September 1948 Solid line first test dotted line last test shaded area gain in decibels

TABLE 10—*Hearing Losses in Case 6*

Date	Whole range loss, %		Speech range loss %		Binaural loss, %	Condition of ossicles	
	Right ear	Left ear	Right ear	Left ear		Right ear	Left ear
12/ 6/47	13 4/8	9 1/8	15	9	1 6	Movable	Impeded Motion
1/20/48	12 5/8	9 6/8	13	9	1 6	Movable	Impeded Motion
3/14/48	13	11	12	10	1 1	Movable	Impeded Motion
6/16/48	12 4/8	8 6/8	9	8	0 8	Movable	Impeded Motion
7/ 7/48	12 1/8	8 1/4	10	6	0 6	Movable	Impeded Motion
9/17/48	5 4/8	7 6/8	2	4		Movable	Impeded Motion

passed She visited her physician, who gave her hormone pills

The attack had come on just before her menstrual period She was under treatment by inflation of the eustachian tubes When I examined her the feeling of fullness had gone She was not conscious of any deafness She complained of a feeling of dizziness, somewhat less severe during the week that had just passed

She was the mother of one child She had had no miscarriages and no abortions Her father was deafened as a result of infection At the age of 6 years the patient had had an abscess in the right ear, but no otic trouble thereafter

Physical examination revealed the nose to be normal In the right tonsil bed there were some tabs of tissue Cerumen was present in the left ear The posterior portion of the drum was most movable. The drum was conical, the umbo of the malleus seemed drawn sharply inward, at an angle of 45 degrees to the horizontal position The vascular reflex was absent, and the ossicles were impeded in motion

The right ear showed an atrophic spot between 5 and 6 o'clock on the drum, resembling a healed perforation The ossicles were movable The vascular reflex was much retarded The umbo was bound down against the promontory (conical position) There was scar tissue around the eustachian tube at the pharyngeal orifice Both eustachian tubes were patent

TABLE 11—*Biochemical Hematologic Values in Case 6*

Constituent	Normal value	Value in Case 6
WB—Urea N	12–15	12 5
WB—Uric acid	2 5–3 5	2 0
WB—Sugar	80–120	95 3
BS—Cholesterol	160–200	187 0
BS—Phosphorus	2 5–4 0	2 6
BS—Calcium	9–11	9 9
BS—Carotene	115–122	116 9
BS—Vitamin A	70–197	106 9
BP—Vitamin B_1	0 6	0 856
BP—Vitamin C	0 8–2 4	2 1
BS—Total protein	6 5–8 2	7 8
BS—Albumin %	4 6–6 7	5 9
BS—Globulin %	1 2–2 3	1 9

A summary of the results of functional tests is given in Table 10 Tuning fork tests showed no prolonged bone conduction and no raised lower tone limit above 64 double vibrations

Table 11 shows the results of biochemical examination of the blood No hypercholesterolemia was evident, therefore the prognosis was good as to the improvement of hearing acuity if the dysfunction at the cochlear nerve ends were relieved by supplying the deficiency in the *diphospho thiamine-magnesium protein* item of the Vitamin B group The hearing results justified this

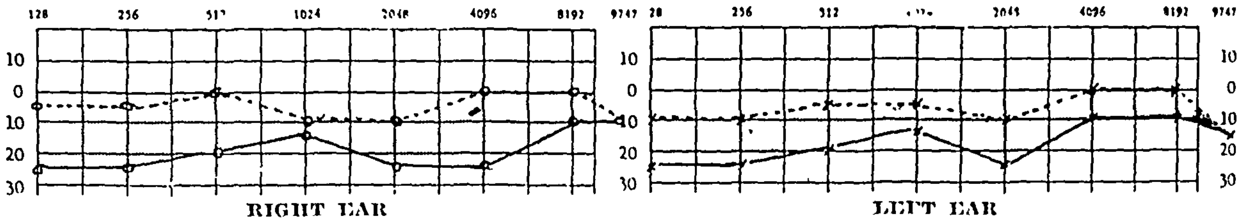


Fig. 6.—Case of H. W., aged 22, as observed from October 1946 to July 1949. Solid line, first test; dotted line, last test; shaded area, gain in decibels

Table 12.—*Hearing Losses in Case 7*

Date	Whole range loss, %		Speech range loss, %		Binaural loss, %	Condition of ossicles	
	Right ear	Left ear	Right ear	Left ear		Right ear	Left ear
10/23/46	17	16	16	16	7 2	Mobile	Mobile
1/ 7/47	19	14	20	17	11 6	Mobile	Mobile
3/16/47	16	11	16	18	11 4	Mobile	Mobile
7/16/47	11	9	8	16	3 1	Mobile	Mobile
11/25/47	8	7	5	11	2 1	Mobile	Mobile
1/12/48	8	4	5	11	0 9	Mobile	Mobile
1/15/49	11	11	8	9	1 4	Mobile	Mobile
1/27/49	7	7	5	8		Mobile	Mobile
3/11/49	5	5	5	5		Mobile	Mobile
7/11/49	4	5	5	5		Mobile	Mobile

It is worthy of note that this patient was totally unaware of her hearing loss. She came under observation because of dizziness, and her loss of hearing was discovered at functional examination. Had instability of the vestibular apparatus not brought her to therapy at a time when the duration of her dysfunction was short and its evolution slight, I have no doubt that other distressing symptoms would have supervened. Her condition is now under control and will remain so if she returns for periodic functional checkups, which are necessary because there is no other means of discovering whether her deficiency is or is not a permanent one. If it is, it must be supplied (in a manner similar to the administration of insulin to diabetic patients) in order to maintain physiologic function of the auditory and vestibular mechanisms.

Table 13.—*Biochemical Hematologic Values in Case 7*

Constituent	Normal value	Value in Case 7
WB—Urea N	12–15	18 3
WB—Uric acid	2 5–3 5	2 3
WB—Sugar	80–120	95 0
BS—Cholesterol	160–200	166 8
BS—Phosphorus	2 5–4 0	
BS—Calcium	9–11	11 7
BS—Carotene	115–122	113
BS—Vitamin A	70–197	79 1
BP—Vitamin B_1	0 6	0 8
BP—Vitamin C	0 8–2 4	1 39
BS—Total protein	6 5–8 2	8 0
BS—Albumin %	4 6–6 7	6 2
BS—Globulin %	1 2–2 3	1 8

Case 7: In this case there was some degree of hyperpyruvemia but no hypercholesterolemia. Miss H. W., aged 22, had been hard of hearing for one year. There was no familial history of deafness. The patient had no tinnitus and no dizziness. She had had chickenpox, mumps and measles in childhood, as well as an abscess in the right ear. Tonsillectomy had been advised. She had worked in a noisy factory for four and one-half years.

Physical examination revealed a very small spur on the right side of the nasal septum. The tonsils were hypertrophied. The whole of the right ear

TABLE 14 —*Hearing Losses in Case 8*

Date	Whole range loss %		Speech range loss %		Binaural loss %	Condition of ossicles	
	Right ear	Left ear	Right ear	Left ear		Right ear	Left ear
9/12/47	12	24	6	21	2 1	Mobile	Mobile
11/17/47	10	24	4	16	2 0	Mobile	Mobile
12/22/47	10	17	3	13	0 6	Mobile	Mobile
3/27/48	9	18	0	9		Mobile	Mobile
9/21/48	8	17	2	10		Mobile	Mobile
11/24/48	8	18	0	8		Mobile	Mobile
3/22/49	12	19	4	9		Mobile	Mobile

drum and also the ossicles were movable The drum was retracted The canal was wide The vascular reflex was slow There were a few atrophic spots on the drum

The canal of the left ear was narrower than that of the right The posterior segment was most movable, although the whole drum moved The drum was retracted There were no scars

This patient presented an endocrinopathic condition She was overweight with adipose tissue unevenly distributed over her body

Table 12 is a summary of the hearing losses Although bone conduction tests were heard at all cycle frequencies there was prolonged bone conduction in both ears There was no raised lower tone limit above 64 double vibrations, and no familial history whatever of a heritage of deafness

Figure 6 shows the first and the most recent audiometric charts of her hearing losses Biochemical tests of the blood showed no hypercholesterolemia but did reveal some degree of hyperpyruvemia The cochlear and vestibular mechanisms were evidently influenced by the hypothyroid condition There being no positive family history of deafness, no raised lower tone limit, no impeded motion in the ossicular chains and no hypercholesterolemia, the prognosis was good for a recovery of physiologic acoustic and vestibular function if replacement therapy were instituted in addition to correction of the endocrine disturbance

TABLE 15 —*Biochemical Hematologic Values in Case 8*

Constituent	Normal value	Value in Case 8 9/20/47	Value in Case 8 9/20/48
WB—Urea N	12–15	15 0	12 1
WB—Uric acid	2 5–3 5	2 45	2 38
WB—Sugar	80–120	113 0	100
BS—Cholesterol	160–200	280	280
BS—Phosphorus	2 5–4 0	9 1	3 77
BS—Calcium	9–11	9 1	9 5
BS—Carotene	115–122	122 2	117 3
BS—Vitamin A	70–197	110	93 85
BP—Vitamin B_1	0 6	0 786	0 80
BP—Vitamin C	0 8–2 4	1 9	1 64
BS—Total protein	6 5–8 2	7 08	7 1
BS—Albumin %	4 6–6 7	5 18	5 5
BS—Globulin %	1 2 2 3	1 9	1 6

Therapy aimed to correct hypothyroidism, together with a fat free diet, brought excellent results Time must pass before it can be determined whether the results are permanent or whether the replacement of deficiencies created by hypothyroidism will have to be indefinitely continued

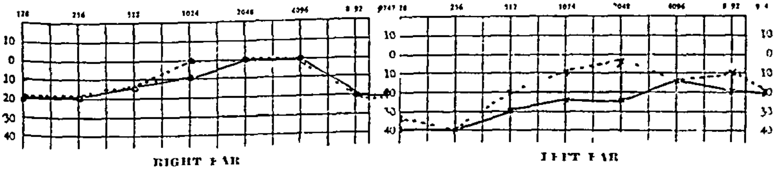


Fig 7 —Case of A I aged 50 yrs observed from September 1947 to March 1949 Solid line first test dotted line last test shaded area gain in decibels

Case 8: Mr. A. E., aged 49, had undergone a turbinectomy twenty-seven years previously. Three or four years prior to examination he had begun to sniffle. He had trouble in breathing and was allergic. A spur had been removed from the right nostril on Oct. 3, 1941. He stated that he had rhythmic tinnitus associated with low blood pressure.

Physical examination revealed hypertrophied turbinates. The drum of the right ear was indurated. The whole drum was movable. The vascular reflex was prompt. Cerumen was present. The canal was not wide. The cough reflex was absent. The left ear showed a thinly covered perforation in the posterior superior quadrant at about 2 o'clock. The vascular reflex was slow.

A summation of the hearing losses is given in Table 14. The first and the most recent audiograms are charted in Figure 7.

The blood chemical data (Table 15) demonstrated, among other things, hypercholesterolemia and hyperpyruvemia. Under appropriate therapy (to be detailed later in this article) there was definite improvement in the hearing. An examination made one year later showed both hypercholesterolemia and hyperpyruvemia still present. Tests of hearing acuity showed improvement up to November 1948; the patient then left my control and remained away four months without therapy, believing himself cured. On his return, in March 1949, hypercholesterolemia being again observed, he was advised to resume his former diet and medicine. Whether or not he has done so is unknown.

From this case, among others in which the patients stopped their treatments, diets and medication and returned for treatment after a lapse of time, there results an impression that the therapy required is probably replacement of items lacking to the enzymatic system and that, therefore, both diet and medication will have to be continued for an indefinite time. On this question no positive opinion can be expressed at present. It is well to note, however, the level of hearing acuity on Nov. 24, 1948, and its reversion almost to its original status on March 22, 1949, between which dates the patient took no medicines and failed to maintain the diet set for him.

Case 9: D. R., a man aged 57, had had severe constant tinnitus in the right ear since the preceding September. Dizzy spells had occurred at intervals for about three months and then subsided. The hearing was affected, although there was no family history of deafness. The patient had had an attack of coronary thrombosis. His dizzy spells gave him a sensation of swaying rather than of rotation. His tinnitus sounded like "cooking water" or "waves." He had had at least two so-called head colds, with profuse watery discharge, during the winter, in which, during the second week, his chest usually became involved. Since abatement of the dizzy spells the colds had disappeared.

Physical examination revealed a small spur on the left side of the nasal septum, and another on the right (toward the front on the left and about halfway back on the right). Examination of the throat revealed a bifurcated uvula. The tonsils had been removed; there was some residue. In the right ear the ossicles were impeded in motion, the posterior segment being most movable. The drum was conical. The vascular reflex was absent, as was the cough reflex. There were no scars. A dark shadow was noted behind the umbo. In the left ear the vascular reflex was present. The posterior segment of the drum was most movable. The ossicular chain was

TABLE 16.—*Hearing Losses in Case 9*

Date	Whole range loss, %		Speech range loss, %		Binaural loss, %	Condition of ossicles	
	Right ear	Left ear	Right ear	Left ear		Right ear	Left ear
3/30/48	47	25	41	8	12 2	Impeded Mobility	Impeded Mobility
5/11/48	45	23	38	5	10 2	Impeded Mobility	Impeded Mobility
7/21/48	43	24	38	5	10 3	Impeded Mobility	Impeded Mobility
8/15/48	35	24	29	8	9 2	Impeded Mobility	Impeded Mobility
10/29/48	34	21	25	5	7 2	Impeded Mobility	Impeded Mobility
3/14/49	32	23	25	4	7 8	Impeded Mobility	Impeded Mobility
4/25/49	32	23	21	4	7 0	Impeded Mobility	Impeded Mobility

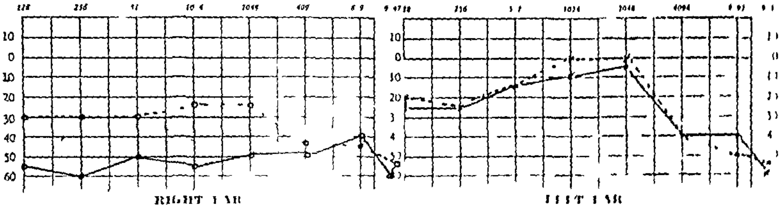


Fig. 8—Case of D. R. [illegible] April 1939 [illegible]

impeded but movable. Th[illegible] The drum was approximately [illegible] flex was absent. Both eust[illegible] nt. Tests for histamine se[illegible] action.

A summary of the [illegible] mation is given in Table [illegible] under conditions of [illegible] response to sound stim[illegible] bands above 2048. In [illegible] a progressive loss at [illegible] The right ear was slightly [illegible] The results of the first and th[illegible] tests are shown in Figure [illegible] values are listed in Table [illegible] therein were hypercholester[illegible] venna, which indicated [illegible] phorylation mechanism. ([illegible] sugar content of the whole bl[illegible] The patient was unaware of [illegible] had his family physician [illegible] betic diet.)

When the patient was [illegible] the [illegible] had abated, the hearing had improved [illegible] the intensity of the tinnitus had lessened. [illegible] stated that he felt better under the [illegible] administered, including histamine [illegible] Details of therapy will be given later.

Case 10. N. B., a man aged 21, had been [illegible] of hearing for one and one half years. There was occasional tinnitus. The patient [illegible] got out of bed and lost his balance [illegible] ing was impaired thereafter. He [illegible] dizzy spells every morning [illegible] During the day his hearing cleared [illegible] allergic to dust and to feathers. He [illegible] three years previously [illegible] trouble.

Physical examination of the [illegible] ledge and spur in contact with the [illegible] left. There was a hypertrophied [illegible] on the right.

The tonsils had been removed.

In the right ear the whole drum was movable. The drum lacked luster. The ossicles were movable. The vascular reflex was slow. Conditions in the left ear were identical.

This patient came under observation mostly because of faulty equilibrium. The symptoms particularly focused on dysfunction of the vestibular mechanism.

A summary of the results of functional hearing tests is shown in Table 18.

After I had detailed to him and to his physician the type of diet and medication required, the patient did not consult me again until three years and five months had elapsed. Under the administered therapy and diet his dizzy spells had abated. The imbalance in equilibrium [illegible] recurred, [illegible] consulted me after the interval noted. The hearing loss on July 2, 1939 was considerably corrected as compared with that observed at the original test taken on Oct. 2, 1936.

[illegible] 18.—[illegible]

[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]

Case 8: Mr. A. E., aged 49, had undergone a turbinectomy twenty-seven years previously. Three or four years prior to examination he had begun to sniffle. He had trouble in breathing and was allergic. A spur had been removed from the right nostril on Oct. 3, 1941. He stated that he had rhythmic tinnitus associated with low blood pressure.

Physical examination revealed hypertrophied turbinates. The drum of the right ear was indurated. The whole drum was movable. The vascular reflex was prompt. Cerumen was present. The canal was not wide. The cough reflex was absent. The left ear showed a thinly covered perforation in the posterior superior quadrant at about 2 o'clock. The vascular reflex was slow.

A summation of the hearing losses is given in Table 14. The first and the most recent audiograms are charted in Figure 7.

The blood chemical data (Table 15) demonstrated, among other things, hypercholesterolemia and hyperpyruvemia. Under appropriate therapy (to be detailed later in this article) there was *definite improvement in the hearing. An examination* made one year later showed both hypercholesterolemia and hyperpyruvemia still present. Tests of hearing acuity showed improvement up to November 1948; the patient then left my control and remained away four months without therapy, believing himself cured. On his return, in March 1949, hypercholesterolemia being again observed, he was advised to resume his former diet and medicine. Whether or not he has done so is unknown.

From this case, among others in which the patients stopped their treatments, diets and medication and returned for treatment after a lapse of time, there results an impression that the therapy required is probably replacement of items lacking to the enzymatic system and that, therefore, both diet and medication will have to be continued for an indefinite time. On this question no positive opinion can be expressed at present. It is well to note, however, the level of hearing acuity on Nov. 24, 1948, and its reversion almost to its original status on March 22, 1949, between which dates the patient took no medicines and failed to maintain the diet set for him.

Case 9: D. R., a man aged 57, had had severe constant tinnitus in the right ear since the preceding September. Dizzy spells had occurred at intervals for about three months and then subsided. The hearing was affected, although there was no family history of deafness. The patient had had an attack of coronary thrombosis. His dizzy spells gave him a sensation of swaying rather than of rotation. His tinnitus sounded like "cooking water" or "waves." He had had at least two so-called head colds, with profuse watery discharge, during the winter, in which, during the second week, his chest usually became involved. Since abatement of the dizzy spells the colds had disappeared.

Physical examination revealed a small spur on the left side of the nasal septum, and another on the right (toward the front on the left and about halfway back on the right). *Examination of the throat* revealed a bifurcated uvula. The tonsils had been removed; there was some residue. In the right ear the ossicles were impeded in motion, the posterior segment being most movable. The drum was conical. The vascular reflex was absent, as was the cough reflex. There were no scars. A dark shadow was noted behind the umbo. In the left ear the vascular reflex was present. The posterior segment of the drum was most movable. The ossicular chain was

TABLE 16.—*Hearing Losses in Case 9*

Date	Whole range loss, %		Speech range loss, %		Binaural loss, %	Condition of ossicles	
	Right ear	Left ear	Right ear	Left ear		Right ear	Left ear
3/30/48	47	25	41	8	12.2	Impeded Mobility	Impeded Mobility
5/11/48	45	23	38	5	10.2	Impeded Mobility	Impeded Mobility
7/21/48	43	24	38	5	10.3	Impeded Mobility	Impeded Mobility
8/15/48	35	24	29	8	9.2	Impeded Mobility	Impeded Mobility
10/29/48	34	21	25	5	7.2	Impeded Mobility	Impeded Mobility
3/14/49	32	23	25	4	7.8	Impeded Mobility	Impeded Mobility
4/25/49	32	23	21	4	7.0	Impeded Mobility	Impeded Mobility

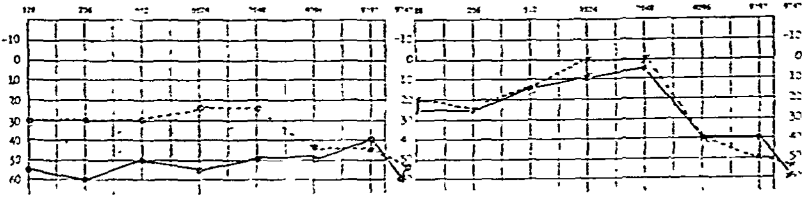


Fig. 8.—Case of D. B., aged 57, as observed from March 1948 to April 1949. Solid line, first test; dotted line, last test; shaded area, gain in decibels.

impeded but movable. There were no scars. The drum was approximately conical. The cough reflex was absent. Both eustachian tubes were patent. Tests for histamine sensitivity gave a 4 plus reaction.

A summary of the results of functional examination is given in Table 16. Bone conduction tests under conditions of masking showed failure of response to sound stimuli in all frequency cycle bands above 2048. In speech frequency there was a progressive loss at 512 to 2048 cycles per second. The right ear was slightly worse than the left. The results of the first and the most recent audiometric tests are shown in Figure 8. The biochemical blood values are listed in Table 17. The pertinent factors therein were hypercholesterolemia and hyperpyruvemia, which indicated impairment of the phosphorylation mechanism. (Note also the increased sugar content of the whole blood specimen. The patient was unaware of any hyperglycemia, nor had his family physician prescribed an antidiabetic diet.)

When the patient was last seen, the dizzy spells had abated, the hearing had improved, and the intensity of the tinnitus had lessened. The patient stated that he felt better under the diet and therapy administered, including histamine desensitization. Details of therapy will be given later.

Case 10: N. B., a man aged 21, had been hard of hearing for one and one-half years. There was occasional tinnitus. The patient said that he had got out of bed and lost his balance and that hearing was impaired thereafter. He complained of dizzy spells every morning on arising from bed. During the day his hearing cleared up. He was allergic to dust and to feathers. He had had asthma three years previously and complained of sinus trouble.

Physical examination of the nose revealed the ledge and spur in contact with the turbinate on the left. There was a hypertrophied middle turbinate on the right.

The tonsils had been removed.

In the right ear the whole drum was movable. The drum lacked lustre. The ossicles were movable. The vascular reflex was slow. Conditions in the left ear were identical.

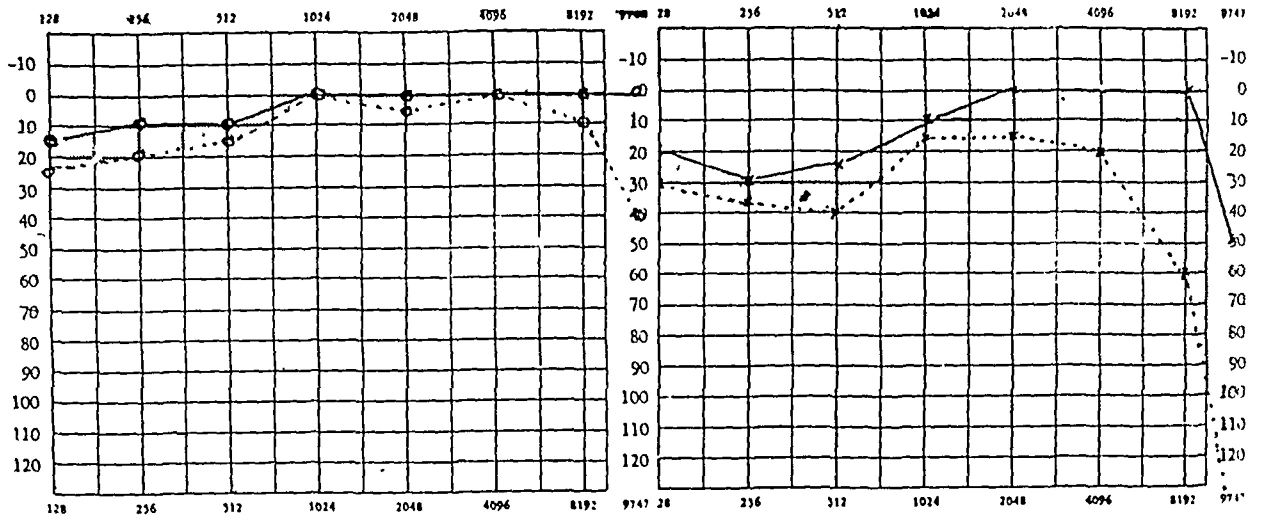
This patient came under observation mostly because of faulty equilibrium. The symptoms particularly focused on dysfunction of the vestibular mechanism.

A summary of the results of functional hearing tests is shown in Table 18.

After I had detailed to him and to his physician the type of diet and medication required, the patient did not consult me again until three years and five months had elapsed. Under the administered therapy and diet his dizzy spells had abated. The imbalance in equilibrium having recurred, he again consulted me after the interval noted. The hearing loss on July 28, 1949, was considerably worsened as compared with that observed at the original test taken on Oct. 23, 1946.

TABLE 17.—*Biochemical Hematologic Values in Case 9*

Constituent	Normal value	Value in Case 9
WB—Urea N	12–15	14.6
WB—Uric acid	2.5–3.5	2.33
WB—Sugar ..	80–120	126.0
BS—Cholesterol	160–200	312.5
BS—Phosphorus	2.5–4.0	3.34
BS—Calcium	9–11	9.8
BS—Carotene	115–122	120.6
BS—Vitamin A	70–197	102.4
BP—Vitamin B_1	0.6	0.80
BP—Vitamin C	0.8–2.4	1.4
BS—Total protein	6.5–8.2	6.6
BS—Albumin %	4.6–6.7	4.8
BS—Globulin %	1.2–2.3	1.8



RIGHT EAR RIGHT EAR

Fig. 9.—Case of N. B., aged 21, as observed from October 1946 to July 1947. Solid line, first test; dotted line, last test; shaded area, gain in decibels.

TABLE 18.—*Hearing Losses in Case 10*

Date	Whole range loss, %		Speech range loss, %		Binaural loss, %	Condition of ossicles	
	Right ear	Left ear	Right ear	Left ear		Right ear	Left ear
10/23/46	4 2/8	15 7/8	3	9		Movable	Movable
7/28/49	15 6/8	36 7/8	7			Movable	Movable

Audiograms showing his hearing losses are charted in Figure 9.

Tuning fork tests revealed prolonged bone conduction in the right ear, indicative of a conduction type of deafness. In the left ear the bone conduction was shortened, indicative of a neurologic type of deafness. Yet both ossicular chains were movable. The audiometric tests of bone conduction under conditions of masking gave response in all frequency cycles tested.

TABLE 19.—*Biochemical Hematologic Values in Case 10*

Constituent	Normal value	Value in Case 10, 10/23/46	Value in Case 10, 7/26/49
WB—Urea N	12–15	15 5	14 6
WB—Uric acid.	2 5–3 5	2 9	3 7
WB—Sugar	80–120	85 0	105 5
BS—Cholesterol	160–200	185 0	250 0
BS—Calcium	9–11	11 53	10 25
BS—Carotene	115–122	121 8	116 3
BS—Vitamin A	70–197	84 7	97 1
BP—Vitamin B_1	0 6	0 826	0 84
BP—Vitamin C	0 8–2 4	1 46	1 88
BS—Total protein	6 5–8 2	6 71	6 75
BS—Albumin %	4 6–6 7	4 80	4 35
BS—Globulin %	1 2–2 3	1 91	2 40

In Table 19 are the data obtained by two biochemical examinations of the blood, one when the patient first came under observation and the second after a lapse of nearly three and one-half years.

At the first examination hyperpyruvemia was evident in addition to a very low sugar content, and there were other slight trends away from the normal levels of blood constituents. In the second examination, hypercholesterolemia and hyperpyruvemia coincided with the deterioration of cochlear dysfunction, as was demonstrated by the much greater hearing losses presented.

The excess of calcium may be ascribed to either of two factors or it may contribute to both. In a study published in 1925[6] of the calcium content of the blood in cases of otosclerosis, I expressed the opinion that

TABLE 20 *Hearing Losses in Case 11*

Date	Whole range loss %		Speech range loss %		Binaural loss %	Condition of ossicles	
	Right ear	Left ear	Right ear	Left ear		Right ear	Left ear
10/29/48	[illegible]	31	[illegible]	35	15.5	Movable	Movable
6/13/49	41.3	[illegible]	[illegible]	33	10.3	Movable	Movable
7/11/49	[illegible]	[illegible]	44	32	11.8	Movable	Movable

calcium in excess [illegible] meant leakage from its stores in the bone and hence could be interpreted as indicating an active otosclerotic [illegible] in the ear.

In view of the [illegible] examination in Case 10 I had no doubt that there was an active lesion despite the absence of a positive familial history of deafness. In this case the lesion had not been active for any great length of time. Additional evidence in support of my diagnosis was afforded by the patient's basal metabolic rate which was 22. The diagnosis of subclinical hypothyroidism was sustained.

The other factor I have mentioned stems from the phosphorus-calcium imbalance that existed as a background to the patient's allergy. His tests for histamine sensitivity resulted in a 4 plus reaction. He is now undergoing desensitization.

This patient is improving under measures that will be detailed in the section headed "Therapy."

Case 11. Mrs. I. B., aged 41, had a history of tinnitus in the right ear of one month's duration and occasionally changing in character. There had also been loss of hearing in the right ear for about one month. There was no vomiting. There had never been any discharge from the ears. Colds were frequent. There was no familial history of deafness. Diseases of the gallbladder and arthritis were present. The patient complained of frequent headache. There was a history of measles, whooping cough and chickenpox. The patient had vague dizzy spells and fainted occasionally (once in approximately two months). She had two children

TABLE 21.—*Biochemical Hematologic Values in Case 11*

Constituent	Normal value	Value in Case 11, 11/9/48	Value in Case 11, 7/15/49
WB—Urea N	12-15	13.0	16.8
WB—Uric acid	2.5-3.5	3.4	3.15
WB—Sugar	80-120	113.0	126.0
BS—Cholesterol	160-200	312.5	270.0
BS—Phosphorus	2.5-4.0	2.7	3.63
BS—Calcium	9-11	10.8	9.8
BS—Carotene	115-122	115.2	117.3
BS—Vitamin A	70-197	92.16	93.7
BP—Vitamin B_1	0.6	0.816	0.826
BP—Vitamin C	0.8-2.4	1.7	1.76
BS—Total protein	6.5-8.2	6.5	6.5
BS—Albumin %	4.6-6.7	4.85	4.7
BS—Globulin %	1.2-2.3	1.65	1.8

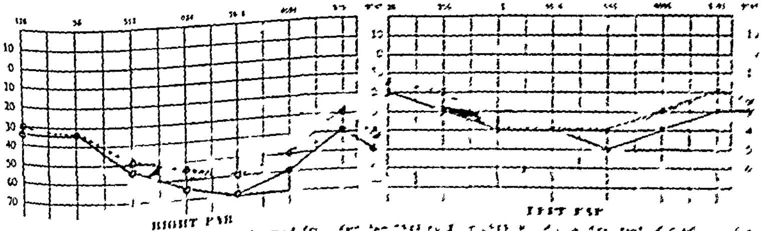


Fig 10—Case of I. B., aged 41 [illegible]

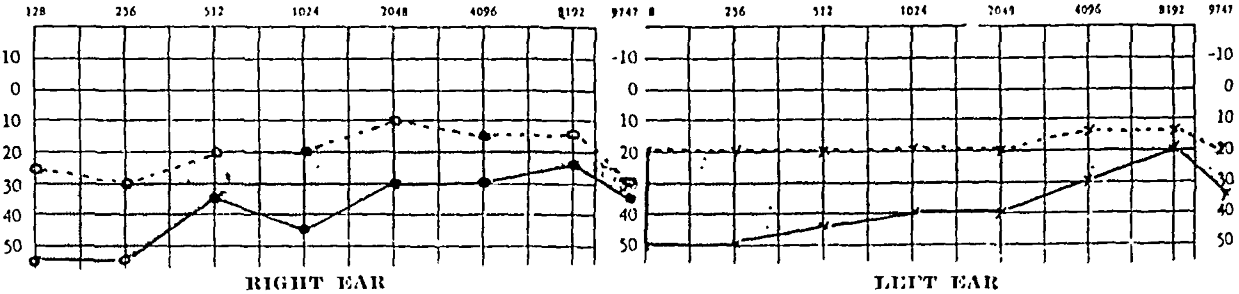


Fig. 11—Case of M. M., aged 31, as observed from September 1946 to November 1948. Solid line, first test; dotted line, last test; shaded area, gain in decibels.

TABLE 22.—*Hearing Losses in Case 12*

Date	Whole range loss, %		Speech range loss, %		Binaural loss, %	Condition of ossicles	
	Right ear	Left ear	Right ear	Left ear		Right ear	Left ear
9/11/46	35	35	29	33	27.3	Movable	Movable
11/ 1/46	38	34	28	34	....	Movable	Movable
12/ 9/46	32	34	29	34	....	Movable	Movable
1/ 6/47	31	33	29	37	....	Movable	Movable
2/25/47	30	32	25	37	20.3	Movable	Movable
3/22/47	30	26	25	35	19.4	Movable	Movable
7/21/47	27	26	21	31	12.8	Movable	Movable
11/25/47	25	24	20	27	10.9	Movable	Movable
1/ 7/48	24	22	19	28	10.3	Movable	Movable
5/19/48	22	22	15	25	7.0	Movable	Movable
7/ 7/48	21	22	15	23	7.1	Movable	Movable
7/30/48	20	17	13	16	4.7	Movable	Movable
11/ 5/48	18	16	13	16	4.2	Movable	Movable

Physical examination revealed polyps on the right side of the nasal septum from the ethmoidal area. The tonsils had been removed. There was granular pharyngitis.

TABLE 23.—*Biochemical Hematologic Values in Case 12*

Constituent	Normal value	Value in Case 12
WB—Urea N....	12-15	13.8
WB—Uric acid...	2 5-3 5	1 5
WB—Sugar......	80-120	78.5
BS—Cholesterol...	160-200	155.0
BS—Phosphorus..	......	......
BS—Calcium....	9-11	9.0
BS—Carotene ...	115-122	113 6
BS—Vitamin A...	70-197	79 1
BP—Vitamin B_1 .	0 6	0 826
BP—Vitamin C ...	0 8-2 4	1 34
BS—Total protein	6 5-8 2	6 95
BS—Albumin % ..	4 6-6.7	4 57
BS—Globulin %	1 2-2 3	2 38

In the right ear, the whole drum moved. The ossicles were movable. The vascular reflex was absent. Cerumen was present. The canal was not wide. In the left ear, the posterior part was movable. The vascular reflex was present. The canal was not wide. There were no atrophic spots. The eustachian tubes were patent. The blood pressure was 129 systolic and 90 diastolic. The histamine sensitivity was 4 plus.

A summation of the hearing losses is shown in Table 20.

The first and the most recent audiograms are charted in Figure 10. Bone conduction tests under conditions of masking evoked no response to the frequency cycles of 2048, 4096 and other frequencies at the 10-decibel level in both ears. There was prolonged bone conduction, and a raised lower tone limit was noted above the 64 double vibration level.

The results of chemical examinations of the blood are shown in Table 21.

At the first blood test a high degree of hypercholesterolemia was shown together with hyperpyruvemia In the second examination the hypercholesterolemia had improved under diet medication and desensitization processes to correct histamine hypersensitivity The functional tests seemed to indicate that an otosclerotic lesion was present Yet after histamine desensitization the calcium content reached the level of low normal and the patient denied any familial history of deafness*

Disease of the gallbladder and rheumatoid arthritis were also pertinent factors in influencing the results of examination

The duration of hearing loss and tinnitus as given in the history must be discounted also It is difficult to concede that in one month these conditions could bring about the degree of cochlear and vestibular dysfunction evidenced by the functional examination particularly with an unimpeded ossicular chain movement in both ears (although slightly limited in motion in the *left* ear which happened to be the better hearing ear)

Under the administered therapy the hearing is improving

Case 12 Mrs M M, aged 31 presented a marked contrast to the patients whose cases are cited above as showing hypocholesterolemia and hyperpyruvemia

She had been hard of hearing since pregnancy eight years before Her trouble started with pounding tinnitus, later changing to 'whistle' tinnitus There was no familial history of deafness She had had chickenpox, measles and whooping cough in childhood She had never had discharging ears She had been told that she had a heart murmur She was anemic

Physical examination revealed a deflected nasal septum, with a spur to the left The tonsils had been removed The pharynx was clean The canal of the right ear was narrow Cerumen was present The posterior segment of the drum was most movable The ossicles were movable The vascular reflex was slow The cough reflex was absent The condition of the left ear was similar to that of the right

The first and the most recent audiograms are charted in Figure 11 Bone conduction tests under conditions of masking indicated hearing at all frequency cycles with both ears There was no prolonged bone conduction but the lower tone was raised above the 64 double vibration level in both ears according to tests with tuning forks A summation of the numerous audiometric hearing tests is given in Table 22

The biochemical blood values are summarized in Table 23 There was but one pertinent observation, namely hyperpyruvemia, denoting a deficiency in the diphosphothiamine magnesium protein item of the vitamin B group There was also too low a level of sugar in the blood Either this evidenced an overactivity of the insulin factor or the liver was handicapped in delivery of this item to the blood stream

Under a regulatory diet, administration of thyroid extract and replacement therapy to overcome the deficiency indicated by the hyperpyruvemia this patient, in the course of little over a year, improved her hearing acuity so that, when her disability was estimated binaurally by the Bunch method, the dysfunction could be estimated at 4 2 per cent of disability in hearing the spoken voice This patient must report once in a while for rechecks of her hearing because of two factors the onset coincidental with a pregnancy, and the raised lower tone limit above the 63 double vibration level

Case 13 Mrs B M, aged 36, presented all the factors to substantiate a diagnosis of otosclerosis During four pregnancies her ears had become clogged She complained of a 'feeling like going into an elevator" She had lost two children Her father was hard of hearing Her own loss of hear

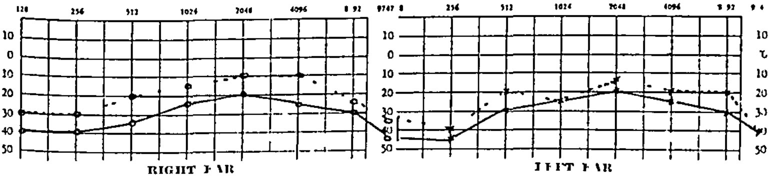


Fig 12—Case of B M aged 36 as observed from June 1948 to June 1949 Solid line first test dotted line last test shaded area gain in decibels

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*It is extremely difficult to persuade patients to admit a heritage of deafness in the family I often discount the story of a negative family history when functional tests and examinations of the blood give evidence to the contrary In a subsequent paper the heritage of deafness will be discussed specifically

TABLE 24.—*Hearing Losses in Case 13*

Date	Whole range loss, %		Speech range loss, %		Binaural loss, %	Condition of ossicles	
	Right ear	Left ear	Right ear	Left ear		Right ear	Left ear
6/23/48	29	30	21	20	10.9	Partly movable	Impeded
9/15/48	27	25	19	19	8.6	Partly movable	Impeded
10/20/48	25	24	17	19	7.8	Partly movable	Impeded
11/17/48	22	26	15	19	5.7	Partly movable	Impeded
12/15/48	24	26	16	18	6.4	Partly mobavle	Impeded
1/12/49	21	24	13	17	4.8	Partly movable	Impeded
3/7/49	22	22	17	16	6.8	Partly movable	Impeded
4/4/49	19	25	12	16	3.3	Partly movable	Impeded
5/6/49	19	25	12	16	3.0	Partly movable	Impeded

ing had been first noticed at a World's Fair test. She had had diphtheria, colds, pneumonia, whooping cough and measles in childhood. She stated that she had formerly had frequent colds, but not recently. There was no history of hay fever. Her father was 78 years old, but had been hard of hearing for many years; he was hard of hearing even in his prime.

Physical examination revealed no nasal abnormality. The tonsils had been cleanly removed, with some residue. The canal of the right ear was not wide. The whole drum moved. The ossicles were impeded in motion. The vascular reflex was absent. There was an atrophic spot about 9 o'clock inward to the hammer handle, and a small scar was noted just above the short process. The drum of the left ear was an exact counterpart of the right drum. The canal was moderately wide. There was one atrophic spot at about 3 o'clock. Both eustachian tubes were patent. The histamine sensitivity test evoked a 4 plus reaction.

TABLE 25.—*Biochemical Hematologic Values in Case 13*

Constituent	Normal value	Value in Case 13
WB—Urea N	12–15	14.2
WB—Uric acid	2.5–3.5	2.6
WB—Sugar	80–120	101.8
BS—Cholesterol	160–200	215.0
BS—Phosphorus	2.5–4.0	3.8
BS—Calcium	9–11	10.2
BS—Carotene	115–122	120.5
BS—Vitamin A	70–197	96.2
BP—Vitamin B_1	0.6	0.84
BP—Vitamin C	0.8–2.4	1.4
BS—Total protein	6.5–8.2	6.90
BS—Albumin %	4.6–6.7	4.75
BS—Globulin %	1.2–2.3	1.15

The first audiograms and the most recent ones are charted in Figure 12. Bone conduction tests under conditions of masking indicated hearing at all frequency cycles. There was prolonged bone conduction, and a raised lower tone limit was noted above the 64 double vibration level in both ears. The ossicular chains were impeded bilaterally.

This patient presented the elements of Bezold's triad to warrant a diagnosis of otosclerosis: (1) a positive family heritage of deafness, (2) prolonged bone conduction and (3) a lower tone limit raised above the 63 double vibration level. A summation of the results of hearing tests is given in Table 24. Gradual reversal of the biochemical processes by medical therapy was striking in this case. The results of biochemical tests of the blood are shown in Table 25. The pertinent observations were a degree of hypercholesterolemia and hyperpyruvemia, associated with an imbalance in the calcium-phosphorus ratio.

Under a regulatory diet and medication designed (1) to control the dysfunction at the cochlear and vestibular mechanisms (the patient suffered equilibrial imbalance in that she had sensations as if she were going suddenly upward in an elevator) and (2) to supply the deficiency indicated by the hyperpyruvemia, the factors at fault in her illness were brought to a halt, with evident practical improvement in her hearing mechanisms. The patient is still under observation.

Cases 14, 15, 16 and 17: Enough case histories have been sketched to show that, among adult patients, hypercholesterolemia and hyperpyruvemia, when found either separately or together in a given case, denote a physiologic enzymatic dysfunction as the pertinent background to symptoms of deafness and vertigo—and among adults tinnitus of various kinds The adult patients whose cases are *here detailed are a sampling from among hundreds* that have been studied

In cases 14 15 16 and 17 therefore it is proposed only to present tables in which the hearing tests and the blood biochemical data are placed side by side for comparison because these 4 patients were two sets of sisters all of whom were deafened See Table 26 for comparison of blood chemical values of 2 of the sisters It is noteworthy *that both showed hypercholesterolemia and hyperpyruvemia*

In the case of Mrs I B physical examination revealed that the canal of the right ear was not enlarged beyond the normal range There was no cerumen The posterior segment was most movable The ossicles were impeded in motion The vascular reflex was absent The cough reflex was absent The drum had calcareous deposits at about 6 o clock The left ear was in the same condition There was one atrophic spot on the drum

Bone conduction tests taken under conditions of masking showed responses to three frequencies only in both ears There was prolonged bone conduction The lower tone limit was raised There was a familial history of deafness A diagnosis of otosclerosis appeared warranted

Physical examination of the other sister Mrs A L, revealed a mild deflection of the nasal septum to the left The throat was normal The canal of the right ear was moderately wide No cerumen was present The skin was thin The whole drum was movable as were the ossicles The vascular reflex was fairly prompt The cough reflex was absent The condition of the left ear was the same The posterior segment of the drum was most movable Both eustachian tubes were patent

Bone conduction tests taken under conditions of masking showed responses to all frequencies There were prolonged bone conduction and a raised lower tone limit plus a familial history of deafness This case also presented the Bezold triad and warranted a diagnosis of otosclerosis

Table 27 presents a comparison of the biochemical blood values in Cases 16 and 17 in which the patients were also sisters (Miss S L and Miss B L)

In both of these cases there were hypercholesterolemia and hyperpyruvemia

Physical examination of Miss S L revealed a small spur at the base of the nasal septum on the left side The tonsils were moderately infected The canal of the right ear was wide There were no scars and no deposits The posterior segment was most movable The ossicles were impeded although there was some motion The vascular reflex was slow The drum of the left ear was a little thickened The ossicles were impeded The vascular reflex was slow and the cough reflex was absent The histamine sensitivity reaction was 4 plus

TABLE 26 —*Biochemical and Hematologic Values in Cases 14 and 15*

Constituent	Normal value	Value in Case 14*	Value in Case 15†
W B—Urea N	12 15	14 3	15 3
W B—Uric acid	2 5–3 5	2 0	2 25
W B—Sugar	80–120	100	88 5
BS—Cholesterol	160–200	215	380
BS—Phosphorus	2 5–4 0		
BS—Calcium	9 11	10 0	10 5
BS—Carotene	115–122	119 3	116 5
BS—Vitamin A	70 197	83 5	81 5
BP—Vitamin B	0 6	0 826	0 906
BP—Vitamin C	0 8 2 4	1 20	1 32
BS—Total protein	6 5 8 2	6 24	6 09
BS—Albumin %	4 6 6 7	4 27	4 80
BS—Globulin %	1 2 2 3		1 29

*Case of Mrs I B aged 45 [illegible] Patient [illegible] Whole range loss right ear 67 left ear 48 Speech range loss right ear 49 left ear 50

†Case of Mrs A L aged [illegible] deafness [illegible] bilateral Whole range loss right [illegible] left ear 30 Speech range loss right ear [illegible] left ear 27 Binaural loss 28%

TABLE 27 —*Biochemical Hematological Values and Hearing Losses in Cases 16 and 17*

Constituent	Normal value	Value in Case 16*	Value in Case 17†
W B—Urea N	12 15	15 0	12 2
W B—Uric acid	2 5 3 5	2 7	2 1
W B—Sugar	80 120	90 0	105 5
BS—Cholesterol	160 200	217	152
BS—Phosphorus	2 5–4 0	3 05	3 0
BS—Calcium	9 11	9 09	9 7
BS—Carotene	115 122	117 2	120 2
BS—Vitamin A	70 197	98 3	100 0
BP—Vitamin B_1	0 6	0 816	0 786
BP—Vitamin C	0 8 2 4	1 12	1 7
BS—Total protein	6 5–8 2	6 9	6 75
BS—Albumin %	4 6–6 7	4 8	5 05
BS—Globulin %	1 2 2 3	2 1	1 07

*Case of Miss S L aged 27 Ossicular chain impeded Whole range loss right ear 28 left ear 30 Speech range loss right ear 29 left ear 29 Binaural loss 26 3

†Case of Miss B L aged 33 Psychogenic history (emotional upset etc) ossicular chain much impeded Whole range loss right ear 44% left ear 45% Speech range loss right ear 33% left ear 33% Binaural loss 29 *Later tests showed some variation* Whole range loss right ear 44% left ear 43 Speech range loss right ear 32 left ear 32 Binaural loss 31 0

TABLE 24.—*Hearing Losses in Case 13*

Date	Whole range loss, %		Speech range loss, %		Binaural loss, %	Condition of ossicles	
	Right ear	Left ear	Right ear	Left ear		Right ear	Left ear
6/23/48	29	30	21	20	10.9	Partly movable	Impeded
9/15/48	27	25	19	19	8.6	Partly movable	Impeded
10/20/48	25	24	17	19	7.8	Partly movable	Impeded
11/17/48	22	26	15	19	5.7	Partly movable	Impeded
12/15/48	24	26	16	18	6.4	Partly mobavle	Impeded
1/12/49	21	24	13	17	4.8	Partly movable	Impeded
3/7/49	22	22	17	16	6.8	Partly movable	Impeded
4/4/49	19	25	12	16	3.3	Partly movable	Impeded
5/6/49	19	25	12	16	3.0	Partly movable	Impeded

ing had been first noticed at a World's Fair test. She had had diphtheria, colds, pneumonia, whooping cough and measles in childhood. She stated that she had formerly had frequent colds, but not recently. There was no history of hay fever. Her father was 78 years old, but had been hard of hearing for many years; he was hard of hearing even in his prime.

Physical examination revealed no nasal abnormality. The tonsils had been cleanly removed, with some residue. The canal of the right ear was not wide. The whole drum moved. The ossicles were impeded in motion. The vascular reflex was absent. There was an atrophic spot about 9 o'clock inward to the hammer handle, and a small scar was noted just above the short process. The drum of the left ear was an exact counterpart of the right drum. The canal was moderately wide. There was one atrophic spot at about 3 o'clock. Both eustachian tubes were patent. The histamine sensitivity test evoked a 4 plus reaction.

The first audiograms and the most recent ones are charted in Figure 12. Bone conduction tests under conditions of masking indicated hearing at all frequency cycles. There was prolonged bone conduction, and a raised lower tone limit was noted above the 64 double vibration level in both ears. The ossicular chains were impeded bilaterally.

This patient presented the elements of Bezold's triad to warrant a diagnosis of otosclerosis: (1) a positive family heritage of deafness, (2) prolonged bone conduction and (3) a lower tone limit raised above the 63 double vibration level. A summation of the results of hearing tests is given in Table 24. Gradual reversal of the biochemical processes by medical therapy was striking in this case. The results of biochemical tests of the blood are shown in Table 25. The pertinent observations were a degree of hypercholesterolemia and hyperpyruvemia, associated with an imbalance in the calcium-phosphorus ratio.

Under a regulatory diet and medication designed (1) to control the dysfunction at the cochlear and vestibular mechanisms (the patient suffered equilibrial imbalance in that she had sensations as if she were going suddenly upward in an elevator) and (2) to supply the deficiency indicated by the hyperpyruvemia, the factors at fault in her illness were brought to a halt, with evident practical improvement in her hearing mechanisms. The patient is still under observation.

Cases 14, 15, 16 and 17: Enough case histories have been sketched to show that, among adult patients, hypercholesterolemia and hyperpyruvemia, when found either separately or together in a given case, denote a physiologic enzymatic dysfunction as the pertinent background to symptoms of

TABLE 25.—*Biochemical Hematologic Values in Case 13*

Constituent	Normal value	Value in Case 13
WB—Urea N	12–15	14.2
WB—Uric acid	2.5–3.5	2.6
WB—Sugar	80–120	101.8
BS—Cholesterol	160–200	215.0
BS—Phosphorus	2.5–4.0	3.8
BS—Calcium	9–11	10.2
BS—Carotene	115–122	120.5
BS—Vitamin A	70–197	96.2
BP—Vitamin B$_1$	0.6	0.84
BP—Vitamin C	0.8–2.4	1.4
BS—Total protein	6.5–8.2	6.90
BS—Albumin %	4.6–6.7	4.75
BS—Globulin %	1.2–2.3	1.15

deafness and vertigo—and, among adults tinnitus of various kinds The adult patients whose cases are here detailed are a sampling from among hundreds that have been studied

In cases 14, 15, 16 and 17, therefore it is proposed *only to present tables in which the hearing* tests and the blood biochemical data are placed side by side for comparison, because these 4 patients were two sets of sisters, all of whom were deafened See Table 26 for comparison of blood chemical values of 2 of the sisters It is noteworthy that both showed hypercholesterolemia and hyperpyruvemia

In the case of Mrs I B, physical examination revealed that the canal of the right ear was not enlarged beyond the normal range There was no cerumen The posterior segment was most movable The ossicles were impeded in motion The vascular reflex was absent The cough reflex was absent The drum had calcareous deposits at about 6 o'clock The left ear was in the same condition There was one atrophic spot on the drum

Bone conduction tests taken under conditions of masking showed responses to three frequencies only in both ears There was prolonged bone conduction The lower tone limit was raised There was a familial history of deafness A diagnosis of otosclerosis appeared warranted

Physical examination of the other sister, Mrs A L, revealed a mild deflection of the nasal septum to the left The throat was normal The canal of the right ear was moderately wide No cerumen was present The skin was thin The whole drum was movable as were the ossicles The vascular reflex was fairly prompt The cough reflex was absent The condition of the left ear was the same The posterior segment of the drum was most movable Both eustachian tubes were patent

Bone conduction tests taken under conditions of masking showed responses to all frequencies There were prolonged bone conduction and a raised lower tone limit, plus a familial history of deafness This case also presented the Bezold triad and warranted a diagnosis of otosclerosis

Table 27 presents a comparison of the biochemical blood values in Cases 16 and 17, in which the patients were also sisters (Miss S L and Miss B L)

In both of these cases there were hypercholesterolemia and hyperpyruvemia

Physical examination of Miss S L revealed a small spur at the base of the nasal septum, on the left side The tonsils were moderately infected The canal of the right ear was wide There were no scars and no deposits The posterior segment was most movable The ossicles were impeded, although there was some motion The vascular reflex was slow The drum of the left ear was a little thickened The ossicles were impeded The vascular reflex was slow and the cough reflex was absent The histamine sensitivity reaction was 4 plus

TABLE 26—*Biochemical Hematologic Values in Cases 14 and 15*

Constituent	Normal value	Value in Case 14*	Value in Case 15†
W B—Urea N	12 15	14 3	15 3
W B—Uric acid	2 5-3 5	2 0	2 25
W B—Sugar	80 120	100	88 5
BS—Cholesterol	160 200	215	380
BS—Phosphorus	2 5 4 0		
BS—Calcium	9 11	10 0	10 5
BS—Carotene	115-122	119 3	116 5
BS—Vitamin A	70-107	83 5	81 5
BP—Vitamin B₁	0 6	0 826	0 906
BP—Vitamin C	0 8-2 4	1 20	1 32
BS—Total protein	6 5-8 2	6 21	6 09
BS—Albumin %	4 6 6 7	4 27	4 80
BS—Globulin %	1 2 2 3		1 29

*Case of Mrs I B, aged [illegible] Acoustic nerve deafness and conduction deafness Patient underwent fenestration procedure Whole range loss right ear [illegible], left ear 18% Speech range loss right ear [illegible], left ear 50%

†Case of Mrs A L, aged 3[illegible] Acoustic nerve deafness and conduction deafness Unilateral Whole range loss right ear [illegible], left ear 30 [illegible] Speech range loss right ear [illegible], left ear 27% Binaural loss 2 8%

TABLE 27—*Biochemical Hematologic Values and Hearing Losses in Cases 16 and 17*

Constituent	Normal value	Value in Case 16*	Value in Case 17†
W B—Urea N	12-15	15 0	12 2
W B—Uric acid	2 5 3 5	2 7	2 1
W B—Sugar	80-120	90 0	105 5
BS—Cholesterol	160-200	215	152
BS—Phosphorus	2 5-4 0	3 09	3 0
BS—Calcium	9-11	9 09	9 7
BS—Carotene	115-122	117 2	120 2
BS—Vitamin A	70 107	98 3	100 0
BP—Vitamin B₁	0 6	0 810	0 780
BP—Vitamin C	0 8 2 4	1 12	1 7
BS—Total protein	6 5 8 2	6 9	6 75
BS—Albumin %	4 6 6 7	4 8	5 05
BS—Globulin %	1 2 2 3	2 1	1 07

*Case of Miss S L, aged 27 Ossicular chain impeded Whole range loss right ear 28%, left ear 30 [illegible] Speech range loss right ear [illegible], left ear [illegible] Binaural loss 26 3%

†Case of Miss B L, aged 33 [illegible] history (emotional upset etc), ossicular chain much impeded Whole range loss right ear 41%, left ear 42% Speech range loss right ear 33%, left ear 33% Binaural loss 29 7 Later tests showed some variation Whole range loss right ear 14%, left ear 43% Speech range loss right ear 32, left ear 32 Binaural loss 11 0

TABLE 28.—*Biochemical Hematologic Values and Hearing Losses in Cases 18 and 19*

Constituent	Normal value	Value in Case 18*	Value in Case 19†
WB—Urea N	12–15	14 4	15 0
WB—Uric acid	2 5–3 5	2 2	2 8
WB—Sugar	80–120	86 5	95 0
BS—Cholesterol	160–200	180 0	177 5
BS—Phosphorus	2 5–4 0	3 85	3 63
BS—Calcium	9–11	10 2	10 3
BS—Carotene	115–122	121 7	120 6
BS—Vitamin A	70–197	103 4	102 3
BP—Vitamin B_1	0 6	0 816	0 826
BP—Vitamin C	0 8–2 4	1 23	1 81
BS—Total protein	6 5–8 2	6 90	6 75
BS—Albumin %	4 6–6 7	4 75	4 15
BS—Globulin %	1 2–2 3	2 15	2 60

*Case of Mrs. A. M., aged 29 Acoustic nerve deafness and conduction deafness. Whole range loss, right ear, 76%; left ear, 71%. Speech range loss, right ear, 69%; left ear, 60% Binaural loss, 92.1%

†Case of Miss M. C., aged 23. Conduction deafness, prolonged bone conduction; raised lower tone limit Whole range loss, right ear, 47%, left ear, 61%. Speech range loss, right ear, 33%; left ear, 37% Binaural loss, 37%

Bone conduction tests taken under conditions of masking showed response to all frequencies in both ears. A raised lower tone limit, markedly prolonged bone conduction, and a familial history of deafness were noted, warranting a diagnosis of otosclerosis.

Physical examination of the other sister, Miss B. L., revealed no nasal abnormality. The throat was also normal. The canal of the right ear was not wide. The posterior segment of the drum was most movable. The vascular reflex was moderately prompt. The drum was retracted. The ossicles were movable but impeded. There were no scars and no atrophic spots. The ossicles of the left ear were much more impeded than those of the right. The canal was not wide. There were no scars and no atrophic spots. Both eustachian tubes were patent.

Bone conduction tests taken under conditions of masking showed response to 512, 1024 and 2048 cycles per second only, in both ears. A raised lower tone limit, prolonged bone conduction and a familial history of deafness warranted the diagnosis of otosclerosis.

Cases 18 and 19 (Table 28): Here another set of deafened sisters' blood biochemical data are shown. In neither of these two sisters was there any evidence of hypercholesterolemia, but in both, among other biochemical abnormalities, appeared a deficiency in the diphosphothiamine-magnesium-protein item of the vitamin B group. In both there was a low sugar content, and in both an imbalance in the phosphorus-calcium ratio was noted. The older sister had been subjected to the noise of factory machines for ten consecutive years. With the deficiency indicated by the hyperpyruvemia present in both, one can comprehend the acoustic trauma suffered by the cochlear nerve during this period, since the myelin sheath of the nerve could not be maintained at optimal physiologic function because of the deficiency incident to hyperpyruvemia. To a lesser degree this deficiency produced deterioration at the nerve synapses and terminals, even though a greater degree of hyperpyruvemia was present in the younger sister.

Case 20: In the case of S. T., aged 9, I present hematologic data on both the child and her mother. The child was severely deafened, and talked only a little at about the age of 2 years. She was born with a tumor on her lip and a lesion, type undetermined, just in front of the tragus of her left ear, to which radium therapy had been applied. The tumor on the lip was surgically removed during first weeks of life. There was a sibling who had normal hearing.

The child S. T. was extremely nervous. It was impossible to get an audiometric test during the first visit. Subsequently her responses were so at variance with the facts that talking to her through the calibrated voice to ear phones, first on one ear, then on the other and then bilaterally, was the only possible means of appraising her hearing acuity and particularly her hearing losses.

Table 30 presents the biochemical blood data of

TABLE 29.—*Hearing Losses in Case 20*

Date	Whole range loss, %		Speech range loss, %		Speech reception,* db		
	Right ear	Left ear	Right ear	Left ear	Right ear	Left ear	Binaural
3/28/49	71	97	65	100	55	0	
5/19/49.					50	0	35

*With Landis speech reception machine

TABLE 30 —*Biochemical Hematologic Values in Case 20*

Constituent	Normal value	Value for mother 6/28/49	Value for daughter 4/9/49	Value for daughter 6/28/49
WB—Urea N	12–15	14 5	15 4	15 1
WB—Uric acid	2 5–3 5	2 5	3 1	3 1
WB—Sugar	80–120	100	112 5	105 5
BS—Cholesterol	160–200	280	305 0*	187 0*
BS—Phosphorus	2 5–4 0	3 63	2 78	5 05
BS—Calcium	9–11	9 9	10 2	9 4
BS—Carotene	115–122	118 6	118 6	120 5
BS—Vitamin A	70–197	100 8	100 2	100 8
BP—Vitamin B_1	0 6	0 6	0 80	0 816
BP—Vitamin C	0 8–2 4	1 06	1 78	1 18
BS—Total protein	6 5–8 2	7 15	6 55	6 25
BS—Albumin %	4 6–6 7	4 50	4 60	3 95
BS—Globulin %	1 2–2 3	2 65	1 95	2 30

*High normal cholesterol level for child was 190 mg per 100 cc

both mother and daughter There are two tests of the latter

The mother was not my patient It would therefore have been embarrassing to ask her to submit to a hospital checkup to determine the factors at fault in her case, although a pathologic condition was evident in her blood She presented hypercholesterolemia, an imbalance in the calcium-phosphorus ratio and an imbalance in the protein albumin ratio

I have no knowledge of how long these dysfunctions had existed One possibility is that the patient had asymptomic otosclerosis, that is asymptomatic as far as the cochlear and vestibular mechanisms were concerned None the less she had given her daughter the inheritance, and in the child the disease was symptomatic as regards the ear and its mechanisms On the other hand, the mother's hypercholesterolemia may have been the result of some other deficiency disease, undiagnosed as yet

The daughter presented a high degree of hypercholesterolemia at the first blood examination, relatively much higher than that of the mother, since that of the latter was but 80 mg per hundred cubic centimeters in excess, while that of the daughter was 210 mg in excess of the high normal range The daughter also showed a degree of hyperpyruvemia

The child was *fitted* with a hearing aid and given a regulatory diet Medical therapy was instituted to achieve a reversal of the chemical processes at fault, and she was recommended to a school that would teach her the meaning of sound symbols, which she was able to hear by means of the hearing aid

At the second examination, approximately two months later, her hearing and listening faculties, tested with the Landis speech recording machine, gave evidence of improvement in both Coincidentally with the better functioning of the cochlear mechanisms, examination of the blood showed the cholesterol level to be within normal limits A degree of hyperpyruvemia was observed, for the correction of which replacement of the items in the Vitamin B group was prescribed The patient's behavior was *also much improved at the second* examination

TABLE 31 —*Biochemical Hematologic Values and Hearing Losses in Cases 21 and 22*

Constituent	Normal value	Value in Case 21*	Value in Case 22†
WB—Urea N	12–15	13 88	15 3
WB—Uric acid	2 5–3 5	2 6	2 2
WB—Sugar	80–120	75 0	108 8
BS—Cholesterol	160–200	280	250 0
BS—Phosphorus	2 5–4 0	4 50	
BS—Calcium	9–11	9 6	
BS—Carotene	115–122	118 8	117 6
BS—Vitamin A	70–197	99 1	98 4
BP—Vitamin B_1	0 6	0 786	0 786
BP—Vitamin C	0 8–2 4	1 47	1 29
BS—Total protein	6 5–8 2	7 15	
BS—Albumin %	4 6–6 7	4 50	
BS—Globulin %	1 2–2 3	2 65	

*Case of Mrs I R aged 33 Whole range loss right ear 56% left ear 34% Speech range loss right ear 52% left ear 28%. Binaural loss 28%

†Case of Master D R aged 6 Diagnosis audiomutism Child could hear but refused to acknowledge symbols (psychogenic deafness) Heard sounds at 50 decibels spoken to him through Landis speech reception machine

TABLE 32.—*Biochemical Hematologic Values in Case 23*

Constituent	Normal value	Value in Case 23
BS—Cholesterol	160-190	265
WB—Sugar	80-120	95

Cases 21 and 22: For the purpose of this communication there is no point in repeating the familiar story of a mother's deafness and a congenitally deafened child.

It is of great interest to compare the blood of the mother, aged 33 years, and that of the son, aged 6 years (see Table 31).

Both showed hypercholesterolemia, but the child's condition was relatively worse than the mother's; in the case of the child the high normal value was 190 mg. per hundred cubic centimeters. In both mother and child hyperpyruvemia was evident. There was some indication that psychogenic factors were involved. I am unready to report this at present, but I put the cases on record, noting that the mother had suffered a "nervous breakdown" and that my diagnosis in the child's case was audiomutism. (A separate report on a number of children's cases is in preparation).

TABLE 33.—*Biochemical Hematologic Values in Case 24*

Constituent	Normal value	Value in Case 24
WB—Urea N	12-15	13 5
WB—Uric acid	2 5-3 5	3 0
WB—Sugar .	80-120	100 0
BS—Cholesterol	160-190	435 0
BS—Phosphorus	2 5-4 0	4 76
BS—Calcium .	9-11	10 2
BS—Carotene .	115-122	116 8
BS—Vitamin A	70-197	98 6
BP—Vitamin B_1	0 6	0 856
BP—Vitamin C	0 8-2 4	1 2
BS—Total protein	6 5-8 2	6 75
BS—Albumin %	4 6-6 7	4 85
BS—Globulin %	1 2-2 3	1 9

Case 23: F. G., aged 19 months, did not respond to sound. The birth was normal. The mother had 3 children, 2 of whom were apparently normal. The mother took no quinine during pregnancy. F. G. had apparently never been ill at all.

Physical examination revealed a well nourished child, normal as to skeletal structure and musculature. Both ears were otoscopically normal. The child had hypertrophied tonsils.

Functional examination elicited a palpebral reflex when the C-4 fork was sounded at the concha.

Hematologic examination was limited to two factors which I desired particularly to investigate. To take the larger quantity of blood for a complete examination, as is usual in my cases, was not deemed wise because of the child's age (see Table 32). The pertinent factor here was the marked hypercholesterolemia—175 mg. per hundred cubic centimeters in excess of the high normal range. The degree of acoustic dysfunction coincided with the biochemical pathologic condition of the blood. Sugar was studied because in many other cases in this study hypoglycemia was discovered, coincidental with a handicapped and dysfunctioning central nervous system, while the peripheral acoustic end organs were not pathologically involved. Diagnostically it was decided that the child did hear some sounds, and the educational features of therapy were deferred for the time being. However, medication aimed at reversal of the chemical processes resulting in hypercholesterolemia at an age of less than 2 years has been begun.

Case 24: J. B., aged 2 years, was mentally alert but neither spoke nor responded to sound symbols. There was some reaction to a high-pitched whistle and to the C-4 fork with Barany's noise apparatus in the opposite ear.

The blood chemical data are shown in Table 33. They indicate a high degree of hypercholesterolemia and hyperpyruvemia.

Case 25: M. L., aged 10 years, was allergic and suffered loss of hearing in the right ear after a fall on the pavement about six years prior to examination. There was no discharge after the fall. The child was unconscious for about six hours. Recovering consciousness, he could not see or hear until the following day. His neck was dislocated two and a half years later. The mother's brother was hard of hearing. The patient's tonsils had been removed at the age of 3½ years. There was no tinnitus. He was a very nervous child.

Physical examination revealed a watery nasal discharge. The tonsils had been removed. There were granulations on the pharyngeal walls. The remains of adenoids were noted.

The drum of the right ear was conical. The most movable part was the posterior segment. The ossicles were movable. There was slight dullness due to thickening. The ear was not normally translucent. Cerumen was present. The vascular reflex was very slow, and the cough reflex was absent. There was no atrophy. In the left ear the ossicular chain was impeded in motion.

The first and the most recent audiograms are

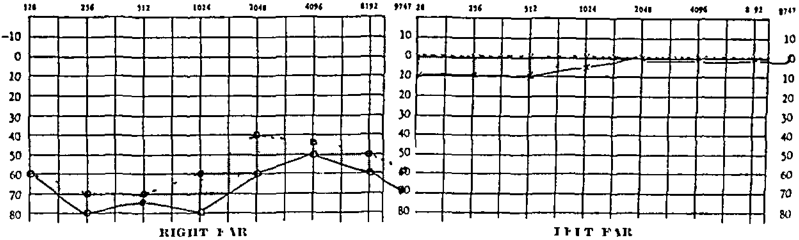

Fig. 13.—Case of M. L., aged 10, as observed from March 1948 to February 1949. Solid line, first test; dotted line, last test; shaded area, gain in decibels.

Table 34.—*Hearing Losses in Case 25*

Date	Whole range loss %		Speech range loss %		Binaural loss %	Condition of ossicles	
	Right ear	Left ear	Right ear	Left ear		Right ear	Left ear
4/ 1/48	60	4	57	4	10.1	Mobile	Impeded
5/ 1/48	56	2	56	2	8.5	Mobile	Impeded
6/ 7/48	54	3	49	0	7.9	Mobile	Impeded
7/ 6/48	52	0	47	0	7.0	Mobile	Impeded
9/24/48	51	0	45	0	6.8	Mobile	Impeded
11/19/48	50	1	45	0	6.6	Mobile	Impeded
12/27/48	50	0	45	0	6.8	Mobile	Impeded
1/24/49	50	0	45	0	6.6	Mobile	Impeded
2/28/49	51	0	49	0	6.8	Mobile	Impeded

charted in Figure 13. Tuning fork tests revealed prolonged bone conduction and a raised lower tone limit above 64 double vibrations in the right ear only. The patient gave a 4 plus reaction to histamine sensitivity tests.

A summation of the hearing losses, tested audiometrically, is given in Table 34.

On May 11, 1948, the patient was tested for his faculty of listening and also for discriminatory listening, while his environment was not soundproof and silent. With the Landis speech recording machine no totally correct speech responses were made with the right ear, but listening was good at the 20 decibel level and binaurally at normal voice levels.

The paradoxic phenomenon of better hearing in the left ear, in which mobility of the ossicular chain was impeded, remains unexplained.

The blood biochemical data are detailed in Table 35. The presence of hypercholesterolemia and hyperpyruvemia in this 10 year old boy coincided with the great degree of his losses in hearing acuity.

The positive family history of deafness, the prolonged bone conduction, and the raised

Table 35.—*Biochemical Hematologic Values in Case 25*

Constituent	Normal value	Value in Case 25
WB—Urea N	12-15	12.5
WB—Uric acid	2.5-3.5	2.8
WB—Sugar	80-120	90.0
BS—Cholesterol	160-200	280.0
BS—Phosphorus	2.5-4.0	4.5
BS—Calcium	9-11	10.1
BS—Carotene	115-122	115.77
BS—Vitamin A	70-197	93.0
BP—Vitamin B_1	0.6	0.856
BP—Vitamin C	0.8-2.4	1.20
BS—Total protein	6.5-8.2	7.5
BS—Albumin %	4.6-6.7	5.5
BS—Globulin %	1.4-2.3	2.0

TABLE 36.—*Hearing Losses in Case 26*

Date	Whole range loss, %		Speech range loss, %		Binaural loss, %
	Right ear	Left ear	Right ear	Left ear	
7/21/48	30	34	29	31	36 0
10/ 9/48	27	32	27	29	30 0
3/15/49	26	28	25	25	26 7
7/ 8/49	29	29	24	21	24 0

lower tone limit in the right ear leave the impression that, had not corrective diet and medication aimed at reversal of the dysfunctioning chemical processes been successful, it would have been only a short time before these same conditions would have been presented by the left ear. The condition warranted a diagnosis of otosclerosis, with uneven status of evolutionary development due to trauma in the right ear.

In the course of nearly a year, the hearing loss has been reduced and the left ear has been brought to levels of normal hearing and listening.

Study of this case is being continued to determine, among other things, whether the medication will have to be indefinitely maintained.

Case 26: F. C., a girl aged 15 years, had suffered loss of hearing from childhood. She had never had a discharge from her ears. Her father's sister and an uncle on the grandmother's side were deafened. The patient had had chickenpox and measles in childhood. During the winter just prior to examination there were frequent colds. She also had hay fever.

TABLE 37.—*Results of Listening Tests* in Case 26*

Date	Listening with right ear	Listening with left ear	Binaural listening
10/9/48	15	15	15
7/8/49	5	5	5

*Speech listening with Landis speech reception machine

TABLE 38.—*Biochemical Hematologic Values in Case 26*

Constituent	Normal value	Value in Case 26, 7/22/48	Value in Case 26, 7/11/49
WB—Urea N	12–15	11 6	13 8
WB—Uric acid	2 5–3 5	3 15	2 2
WB—Sugar	80–120	100 0	112 5
BS—Cholesterol	160–190	175 0	222 5
BS—Phosphorus	2 5–4 0	4 26	3 67
BS—Calcium	9–11	11 1	10 2
BS—Carotene	115–122	117 3	118 6
BS—Vitamin A	70–197	107 1	101 2
BP—Vitamin B_1	0 6	0 80	0 786
BP—Vitamin C	0 8–2 4	0 771	1 31
BS—Total protein	6 5–8 2	7 8	6 40
BS—Albumin %	4 6–6 7	6 0	4 20
BS—Globulin %	1 2–2 3	1 8	2 20

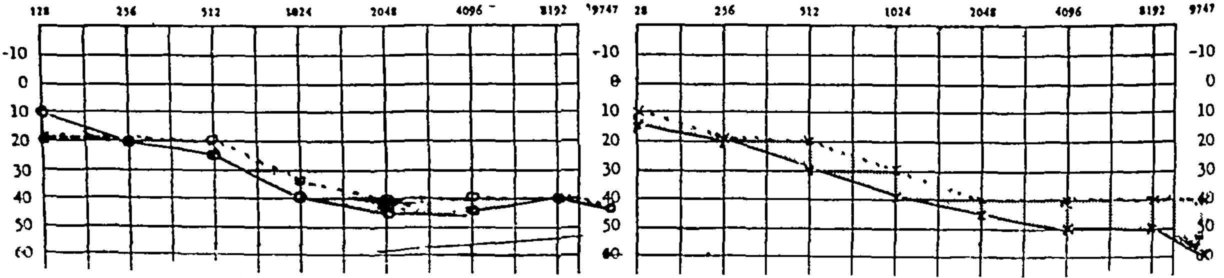

Fig 14.—Case of F. C., aged 15, as observed from July 1948 to September 1949 Solid line, first test; dotted line, last test, shaded area, gain in decibels

Physical examination revealed polypoid ethmoiditis at the left side of the nose The tonsils had been removed There was granular pharyngitis The canal of the right ear was wide The whole drum moved The ossicles also were movable The vascular reflex was very slow The posterior segment of the drum was most movable There was a calcareous deposit on the drum The left ear presented an atrophic spot behind the hammer handle The posterior segment was the most movable portion of the drum The ossicles were impeded in motion The vascular reflex was very slow Cerumen was present The cough reflex was absent There was some atrophy of subcutaneous tissue in both external auditory canals Both eustachian tubes were patent Tests for histamine sensitivity gave a 4 plus reaction

The earliest and the most recent audiograms are charted in Figure 14 Fork tests showed prolonged bone conduction but absence of a raised lower tone limit A summation of the hearing losses is given in Table 36

The results of the functional tests aforementioned seemed out of line to me because of the patient s excellent responses to ordinary room conversation about matters having nothing to do with her otic trouble Suspecting a psychosomatic factor to be responsible for the results indicated by her responses to sound symbols heard in audiometric tests in a soundproof room I submitted her to the listening test with the Landis speech reception machine The result is detailed in Table 37 On the 1949 response, there was good listening and good reporting of conversation at the 15 decibel level of amplification This was a day when the hearing losses had begun to show an improvement on audiometric tests At her visit in July 1949, the audiometric tests showed a greater hearing loss Tests with the Landis machine nevertheless showed an almost normal listening faculty, amplification of only 5 decibels being required to procure perfect responses

Hence the psychosomatic factor was further investigated and presently the girl told me what was troubling her Conference with her parents informed them of the matters at issue

On the other hand her blood chemical examination resulted in interesting data (see Table 38)

In discussing Case 22 I alluded to the presence of hypoglycemia in some of my cases in which psychogenic elements entered into the clinical picture These elements almost always appeared in cases in which dizziness of degrees varying up to actual vertigo with nystagmus were presented In this case in which no hypoglycemia was present it was not to be expected that so young a patient should exhibit vertigo but the psychogenic element was conceded by herself Older persons—women who are in the postmenopausal phase of life and men in the stage analogous to the menopause—whose nervous systems are subject to unusual stresses and strains in either business or social relations, and who seem unable to adjust themselves to these strains, often show hypoglycemia on biochemical examination of the blood In the very young child (under 5 years of age) hypoglycemia is usually coincidental with apathy in cerebration Children so affected learn poorly, are inattentive lack concentration and are difficult to keep at assigned tasks It is not so much that they break discipline as that they appear unable to comprehend its meaning

On the other hand the blood of this patient (F C) exhibited a normal sugar content In the face of her psychosomatic symptoms this was comprehensible because of the element of excitement in her condition Excitement of her nervous system excited the anterior lobe of the

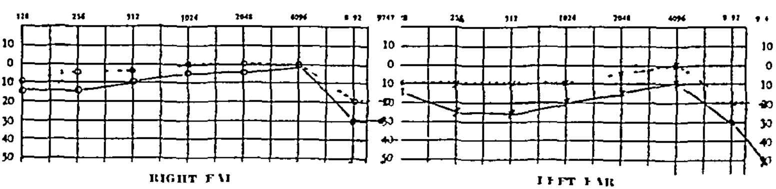

Fig 15 —Case of F T, aged 12 as observed from December 1947 to April 1949 Solid line first to second test shaded area gain in decibels

TABLE 39.—*Hearing Losses in Case 27*

Date	Whole range loss, %		Speech range loss, %		Binaural loss, %	Condition of ossicles	
	Right ear	Left ear	Right ear	Left ear		Right ear	Left ear
12 26 47	12	21	5	16	8	Mobile	Impeded
6 25 48	10	18	3	13	4	Mobile	Impeded
9 10 48	11	12	3	11	0 3	Mobile	Impeded
10 30 48	11	11	3	8	0 3	Mobile	Impeded
12 17 48	11	12	3	7	0 3	Mobile	Impeded
1 21 49	9	9	3	7	0 2	Mobile	Impeded
4 1 49	6	9	0	7		Mobile	Impeded

pituitary gland, with a resultant increase in secretion of epinephrine. This produced a reaction in the carbohydrate metabolism, especially as it applies to glucose. The other items that deserve consideration when the two hematologic reports are studied are (1) the history of deafness in the father's and the grandmother's family and (2) the presence of hyperpyruvemia noted at both examinations, with hypercholesterolemia also present at the second.

The otoscopic observation of impeded mobility of the ossicular chain in the left ear, and the fork tests, which exhibited prolonged bone conduction, taken in consideration of the fact that between July 22, 1948, and July 11, 1949, hypercholesterolemia developed in a case in which there was a family heritage of deafness and in which one ear already showed an impeded ossicular chain made it seem justifiable to classify the case as one of otosclerosis with superimposed psychogenic factors.

Corrective diet and medication have been instituted. Future developments will be checked and reported as occasion presents itself. The case is recorded here because of the conflicting picture it presents, both clinically and upon tests.

Case 27: R. T., a boy aged 12 years, complained of crackling sounds in his left ear on yawning. He was tested in school and was found to have a loss of hearing. There was no deafness in the family. He had had discharging ears at the age of 1 year. This had cleared up. He was subject to frequent colds.

Physical examination revealed a high deflection of the nasal septum, with a spur on the left side. The tonsils had been removed. There was a whitish postnasal drip. In the right ear cerumen was present. The posterior segment showed a healed perforation, and that part was movable. The ossicles were movable. The vascular reflex was moderately prompt. In the left ear the posterior segment was most movable. The ossicles were much impeded. The drum was bound down by adhesions.

The earliest and the most recent audiograms are charted in Figure 15. There was shortened bone conduction but no raised lower tone limit. There was no positive family history of deafness. A summation of the hearing losses is given in Table 39.

The blood biochemical data are shown in Table 40. The first examination, made in December 1947, showed, among chemical processes out of line, hy-

TABLE 40.—*Biochemical Hematologic Values in Case 27*

Constituent	Normal value	Value in Case 27, 12/29/47	Value in Case 27, 6/11/49
WB—Urea N	12–15	13 6	12 6
WB—Uric acid	2 5–3 5	3 3	3.2
WB—Sugar . .	80–120	85	113.0
BS—Cholesterol	160–200	250	195.0
BS—Phosphorus	2 4–4 0	4 2	3.55
BS—Calcium	9–11	11 0	10.1
BS—Carotene .	115–122	117 3	117.7
BS—Vitamin A	70–197	93 8	99.4
BP—Vitamin B_1	0 6	0 8	0.816
BP—Vitamin C	0 8–2 4	1 2	1.48
BS—Total protein.	6 5–8 2	7 8	6.75
BS—Albumin %	4.6–6 7	5 6	4 50
BS—Globulin %	1 2–2 3	2 2	2 25

TABLE 41—*Comparative Biochemical Hematologic Data on Congenitally Deaf Child and Her Parents*

Constituent	Normal value	Value for child*	Value for father†	Value for mother§
WB—Urea N	12–15	12 1	12 0	13 3
WB—Uric acid	2 5–3 5	2 8	3 7	3 04
WB—Sugar	80–120	85 0	92 5	88 0
BS—Cholesterol	160–200	280	195 0	207 5
BS—Phosphorus	2 5–4 0	5 21	3 47	3 06
BS—Calcium	9–11	9 2	9 9	10 1
BS—Carotene	115–122	118 2	121 6	119 8
BS—Vitamin A	70–197	100 5	103 6	101 3
BP—Vitamin B_1	0 6	1 55	0 7	0 8
BP—Vitamin C	0 8–2 4	1 09	1 45	1 23
BS—Total protein	6 5–8 2	6 50	6 75	6 50
BS—Albumin %	4 6–6 7	4 20	4 35	4 15
BS—Globulin %	1 2–2 3	2 30	2 40	2 35

*P A S girl aged 3 years Normal high cholesterol level 190 mg per 100 cc Gave palpebral reflex only to whistle and tuning fork at concha but did hear sounds Ossicles movable

†Mr C S aged 41 Unaware of deafness but showed hearing loss at about 12 db level Had second cousin who was deafened

§Mrs J S aged 26 Unaware of deafness but showed hearing loss at 20 db level Her father was deafened

percholesterolemia and hyperpyruvemia with an imbalance in the calcium phosphorus ratio

Corrective diet and medication aimed at reversal of the chemical processes at fault were instituted Examination of the blood six months later revealed (1) a normal cholesterol content and (2) persistent hyperpyruvemia The functional improvement in the cochlear mechanism was shown in the improved hearing acuity at the last test This patient too is still under observation to determine whether medication should be continued Replacement therapy to supply deficient items of the vitamin B group is under way

Case 28 P A S, a girl aged 3 years, had a positive family history of deafness Her parents reported that the child's grandfather on the father's side and a second cousin on the mother's side were deafened The parents themselves were, however, unaware of being deafened The mother had occasional dizzy spells, which she ascribed to "nervousness"

Biochemical examination of the child's blood revealed hypercholesterolemia and a high degree of hyperpyruvemia (Table 41) I requested that studies be made of both parents' blood and this was done Although the father had no hypercholesterolemia, he did have hyperpyruvemia, and the mother presented both hypercholesterolemia and hyperpyruvemia

Hearing tests of the parents revealed deafness in both but no loss below the 30 decibel level Hence their unawareness of their hearing disability was comprehensible

The father showed a hearing loss for the whole range of hearing of 20 5 per cent in the right ear and 18 4 per cent in the left ear Bone conduction tests taken under conditions of masking showed a progressive loss in the right ear at each frequency cycle band above 512, with no response at all above 4096 frequency p e, the left dropped also from normal at 512 to the 30 decibel level at 8192 The tuning fork tests revealed an acoustic nerve type of deafness, the factor at fault being a deficiency in the diphosphothiamine magnesium protein item of the so called vitamin B group

The mother's hearing losses were less than her husband's She had a whole range loss of only 10 8 per cent in the right ear and 9 25 per cent in the left ear The masked audiometric tests for bone conduction revealed a slight drop in the high note ranges to the 20 decibel level, in contrast with the losses in the low notes to the 25 decibel level in air conduction tests

In Case 27, as in others I have studied I cannot escape the implication of hypercholesterolemia combined with hyperpyruvemia When I remember my early studies of otosclerosis, and reports in the literature of the accidental discovery at autopsy of otosclerotic bone lesions in persons who were asymptomatic as far as hearing loss was concerned, I cannot avoid thinking that this woman may have asymptomatic otosclerosis which may eventually produce definite lesions on the otic capsule and become symptomatic. Her vague story of dizziness, indicating vestibular dysfunction, supports the presumption. I had no chance to make an otoscopic examination of either this woman or her husband. They were concerned only with their child's condition.

For the child, educational matters have been arranged and therapy aimed at reversal of abnormal chemical processes has been started.

THERAPY

The therapist must comprehend clearly the wide range of lesions, endocrinopathies, and even mild neurologic and psychogenic conditions from which the three symptoms deafness, tinnitus and vertigo make their onset. Not only must therapy aim at handling deafness, tinnitus and vertigo but, if at all possible, there must be diagnostic differentiation of the *origins* of these symptoms. It is necessary to determine whether they arise from diverse pathologic conditions *as a secondary symptomatic manifestation* or whether they originate from a condition strictly within the anatomic boundaries of the acoustic and equilibrial apparatuses as an initial, *primary* effect of a systemic enzymatic dysfunction, presenting primary symptoms referable to dysfunctions of the cochlear and the vestibular mechanism.

The otologic therapist must also realize that, in most of the conditions he meets clinically, the results of therapy do not appear with dramatic suddenness. Good results are obtained slowly over a long period. *If the trend toward further deterioration is halted within three months,* continuation of therapy is justified by the favorable prognosis which such a halt in hearing losses, previously progressive, warrants.

The therapeutic needs are twofold:

1. To correct the *subclinical hypothyroidism* so often present (as it was in the majority of my own cases). This calls for therapy to enhance the functional activity of the thyroid gland in its relations to the anterior lobe of the pituitary gland and in its trophic elements as they affect the visceral organs and glands and their internal secretions—and not only the visceral glands and organs but the interplay of the sympathetic and parasympathetic nervous systems, as it affects them must be considered, particularly as regards the cochlear and vestibular mechanisms.

2. To correct *hypersensitivity to histamine,* which, in a very large number of cases studied, was discovered by specific tests.

Few patients show the stigmas of thyroid dysfunction, yet most of them are subclinically hypothyroid. When tested they show a low metabolic rate; also, they are aware of improvement and a feeling of well-being after the administration of thyroid extract in appropriate doses, the dosage being determined by the necessities of the given case.[10] While the other factors at fault (to be discussed later) are being medically treated, it will, as a rule, produce better therapeutic results if thyroid extract is administered with the other medication to be described.

At monthly intervals one intramuscular injection of anterior pituitary extract is very helpful.

The desensitization of the patient who is hypersensitive to histamine is an immunization procedure. This should be started by injection of very small doses of histamine solution until desensitization has been completed. Thereafter a maintenance dose should be given approximately every three weeks to keep the patient immunized. The results are highly satisfactory. So-called "head colds" and "sinus trouble" that have seemed intractable in some patients will disappear. Indirectly, too, the immunization procedure is often effective in inducing a more nearly normal function of the anterior lobe of the thalamus in its regulatory mechanisms of subconscious reaction to deleterious environmental agents. In the desensitized patient, the regulatory mechanisms initiated by histamine hypersensitivity are brought to rest and recuperation. Indirectly this also improves the water, protein and carbohydrate metabolic processes, all of which, in addition to synchronization of the sympathetic and parasympathetic systems, have control centers located in the same general thalamic area.

Since most allergies occur with a background of calcium deficiency, the oral administration of calcium products enhances the effects of desensitization procedure.

Every other lesion and condition—cardiovascular disease; diabetes; trends toward the development of hepatic cirrhosis, dysfunctions of the gallbladder, gonadal aberrations and psychosomatic ailments—must be brought under medical control and therapy in cooperation with the family physician This is particularly important when the cochlear and vestibular dysfunctions stemming from any one of these conditions produce otic symptoms as secondary manifestations

Finally there are the *primary dysfunctions* of the cochlear and vestibular mechanism including those incidental to the heritage of deafness which appears in blood relatives of some patients including the congenitally deafened In these cases biochemical examination of the blood reveals hyperpyruvemia and hypercholesterolemia In many instances in which repeated hematologic studies have been made, hyperpyruvemia preceded hypercholesterolemia in the same patient This was an invariable observation in those cases in which the condition had progressed and a greater deterioration of hearing was evidenced at audiometric examinations subsequent to the first functional and hematologic study in which though hyperpyruvemia was noted, cholesterol levels were normal Obviously when the applied therapy was successful and the hearing loss was halted or the hearing improved no secondary studies of the blood were made in the majority of cases When further hearing losses were evident on functional examination the blood studies were repeated, and the presence of hypercholesterolemia was usually coincidental with the greater deterioration of cochlear function In the congenitally deaf even in the very youngest patient, both hyperpyruvemia and hypercholesterolemia were always present

The initial observation of hyperpyruvemia with subsequent deterioration of the patient's clinical and functional health is comprehensible when it is realized that the carbohydrate metabolism shows dysfunction first Only when protein metabolism becomes secondarily involved does hypercholesterolemia become evident

A brief survey is necessary for appreciation of the significance of these pertinent excesses in the blood as they are related to disturbed metabolism and particularly of the manner in which this disturbance of metabolism produces dysfunctions in the cochlear and vestibular mechanism It is necessary because once the successive steps in dysfunction associated with hyperpyruvemia and hypercholesterolemia are clearly comprehended, these hematologic abnormalities in themselves almost suggest the rational approach to effective therapy

How does hyperpyruvemia affect the acoustic and vestibular mechanisms? The pyruvic acid in the blood is here used as an indicator of the blood level of the so called vitamin B_1 Employment of the term B_1 is a concession to common usage It is not however correct The *enzyme* responsible for the decarboxylation of pyruvic acid is actually not thiamine but *diphosphothiamine magnesium protein* This is a carboxylase In a recent publication[9] I explained that in using the pyruvic acid levels as indicators of a deficiency in the so called vitamin B_1 I was using fractions as compared with normal values The values noted are to be interpreted as indicating *subclinical* deficiencies of this enzyme Vitamin B_1 is essentially concerned with metabolic processes, particularly carbohydrate metabolism According to the view most generally accepted it acts as a catalytic co enzyme prosthetic group in the enzyme system of carbohydrate metabolism *Its specific property is the maintenance of normal nerve function* Physiologists also assign to it the function of controlling and inhibiting the overactivity of cholinesterase Wiggers[11] has stated that nerve fibers, particularly at their terminals release a chemical substance acetylcholine Acetylcholine is the transmitting agent which, in cases like those here studied, must be present at the acoustic and vestibular nerve terminals as well as at nerve synapses along the neural tracts, so that transmission of the nerve impulse may proceed physiologically When the enzyme is deficient, as indicated by hyperpyruvemia, control over cholinesterase is handicapped or lost, the uncontrolled action of cholinesterase destroys the chemical mediator acetylcholine and transfer of the energy of the sound wave pattern along the nerve tracts particularly at the various synapses is handicapped and hindered This deficiency is also evident at the nerve end plates innervating the stapedius and the tensor tympani muscles revealing itself particularly as the factor at fault in the spasmophilic type of otosclerosis.

Deficiency in so-called vitamin B_1 when associated with symptoms of dysfunction in the cochlear or the vestibular mechanism, requires replacement medication to supply the deficiency. Such medication must be continued as long as the deficiency exists, the blood level of pyruvic acid being used as indicator.*

Therapy based entirely upon the oral replacement of thiamine was found unavailing. It failed to secure improved hearing results. Thiamine combined with other components of the vitamin B complex gave better results both clinically and functionally. Finally, when trace metals and amino acids were added, the best clinical and functional results were obtained. Thus B_2 (riboflavin), B_6 (pyridoxin), nicotinic acid, the P-P factor, pantothenic acid, or the filtrate factor biotin and p-aminobenzoic acid, folic acid, and a number of less well characterized vitamins were assembled. In the early cases I used a preparation that required two tablets given every three hours daily. This was a handicap to the patient; later, therefore, I substituted another preparation,† which required that only one tablet be taken three times a day. I have been using the latter tablets since their appearance on the market, with very satisfactory results in functional hearing and in the general clinical picture.

Physiologists have shown that excessive cholesterol handicaps the oxidation processes of the body. When the carbohydrate metabolism is faulty, faulty fat metabolism[12] inevitably ensues. The aforementioned deficiency in the trend toward avitaminosis in the vitamin B group affects also the lipoids of the nerve sheaths, adding a factor toward demyelination and nerve degeneration, and the faulty fat metabolism consequent to carbohydrate metabolic faults causes a deficiency in the lipotropic factors,[12] which results in lipoid deposits in the endothelial layers of arterioles and capillaries. In the smaller blood vessels of the cochlear and vestibular apparatuses, narrowing of the lumen results in blood stasis and lack of oxygenation of the parts, and is the factor incidental to changes in the tissue cells supplied by these vessels.

In this connection it may be interesting to recall Wittmaack's experimental work on poultry,[13] in which the experimental chick was subjected to induced blood stasis of the auditory and vestibular apparatuses in an endeavor to find the initial causative factor in the evolution of the cellular pathologic picture of experimentally induced otosclerotic lesions. Wittmaack never experimentally produced the osseous lesions of otosclerosis, but he did show experimentally produced changes in the end organs of the cochlear and vestibular nerves, due to blood stasis. I do not doubt that absence of lipotropic factors and deposits of lipoids in the arterioles and capillaries of the cochlear and vestibular mechanisms produce a similar blood stasis.

For some time the only medication I used was a corrective diet, bland and fat free, with increased proteins and easily assimilated carbohydrates. In addition, because cholesterol is assumed to be controlled by administration of bile salts, a small dose (approximately 2 gr.) of bile salts* was administered once a day, half an hour after the patient's principal meal.

Recently there has appeared upon the market a preparation that appears better to fulfill the requirements of a more purposeful therapy. Since the endothelial lining of the arterioles and capillaries has lipoid deposits, the therapy now used in conjunction with that cited above to handle the hyperpyruvemia, will tend to correct the faulty fat metabolism by applying lipotropic factors but will cause reabsorption of lipoid deposits in the lining membranes—the endothelial lining of the blood vessels. The newer drug† supplies choline, methionine and inositol, each of which has a beneficial action on the fat metabolism. The tablets contain large doses (choline dihydrogen citrate 450 mg., dextro-laevo methionine, 225 mg. and inositol, 225 mg.)

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*The laboratory work for this study was done in the Molnar Laboratories and under the supervision of Mr. Nicholas M. Molnar, Fellow of the American Institute of Chemists. The test methods used were those of Friedman and Haugan (J. Biochem. 147:415, 1943). Another method was described by G. D. Lu (ibid. 33:249, 1939). In principle, the two methods are similar. Great care must be exercised in distillation and the pressure under which the reagent is distilled. The reading must be taken after the last reduction process, at the end of ten minutes; if it were taken immediately, false values would be obtained. The patient should be completely relaxed and rested before the blood specimen is taken; otherwise, higher values due to exercise might cloud the pathologic picture.

†Betazyme Tablets, distributed by Barrows Chemical Co., New York.

*Desicol capsules, distributed by Parke, Davis and Co.

†Tablets Lipozyme, distributed by Barrows Chemical Co., New York.

In addition to other medication in all cases thyroid extract in small doses is given once daily. Once a month an intramuscular injection of anterior pituitary extract* is administered.

When the history or the symptom complex indicates a deficiency in sex hormones these should be administered additionally.

It must be remembered that most of these patients have multiple needs as far as therapy is concerned. No routine set therapy will ever be successful. The physician is dealing with groups of symptoms that vary considerably from the individual patient's standpoint. Each case usually presents more than one facet, to handle which broad clinical experience is as necessary as is the specific knowledge required for the specialist's practice of otology.

SUMMARY

The author presents a study of 581 cases of deafness of all types which demonstrated the wide range of bodily diseases and dysfunctions from which deafness, tinnitus and vertigo originate.

Biochemical examinations of the blood in the vast majority of cases revealed hyperpyruvemia and hypercholesterolemia. These conditions were present even in infants below 2 years of age, and tests of blood relatives who were deafened gave similar results. The blood values of congenitally deaf children were similar to those of the parent who carried the heritage of deafness, although in some instances the parent was symptom free so far as the acoustic or the vestibular apparatus was concerned. It is suggested that in some instances a parent with the heritage of deafness who has no dysfunction of the cochlear or the vestibular apparatus may nevertheless have asymptomatic otosclerosis.

A method of therapy is indicated that replaces deficient enzymatic elements and thus aids the return to normal carbohydrate metabolism, which in itself would aid fat metabolism. In addition lipotropic factors are administered to reduce the excess of cholesterol in the blood and remove the lipoid deposits in the endothelial linings of the arteries and capillaries. A suitable dietary regime is prescribed. All these therapeutic measures are directed toward causing a reversal of the biochemical processes at fault in cases of this kind.

RÉSUMÉ

L'auteur présente une étude portant sur 581 cas de surdités de toutes catégories qui montre le grand nombre d'affections corporelles et de troubles fonctionnels provoquant la surdité, le tintement et le vertige.

L'examen biochimique du sang dans la plupart des cas révéla une hyperpyruvémie et une hypercholestérolémie. On retrouva ces conditions même chez des enfants au dessus de 2 ans, et les examens de sang des parents qui étaient sourds donnaient des résultats semblables. Les valvules sanguines des enfants atteints de surdité congénitale sont semblables à celles des parents porteurs de l'héritage de surdité, bien que dans quelques cas les parents ne présentent pas de symptômes tant que l'appareil auditif et vestibulaire n'est pas atteint. On pense que, dans quelques cas, un parent portant l'héritage de surdité et qui n'a pas de trouble de l'appareil cochléaire ou vestibulaire peut néanmoins avoir une otosclérose asymptômatique.

La méthode thérapeutique indiquée est celle qui remplace les éléments enzymatiques insuffisants et ainsi aide au retour du métabolisme normal des hydrates de carbone qui lui même aidera au métabolisme des graisses. De plus, des facteurs lipotropiques sont donnés au malade pour réduire l'excès de cholestérol dans le sang et pour enlever le dépôt lipoïde sur le tissu endothélial des artères et des capillaires. Un régime diétetique approprié est prescrit. Toutes ces mesures thérapeutiques sont employées pour obtenir un renversement du processus biochimique dans cette catégorie de cas.

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*Proloid Tablets distributed by the Maltine Co., New York. Ampules Anterior Pituitary Extract distributed by Armour and Co., Chicago.

RIASSUNTO

Passa in esame 581 casi di sordita' di tutti i tipi onde dimostrare quanto vasto sia il campo delle malattie e delle disfunzioni capaci di causare sordita', tinnito e vertigine.

Nella maggioranza dei casi l'esame del sangue rivela un'ipercolesterinenia ed un iperpiruvemia. Queste deviazioni biochimiche figurano anche in bambini al disotto dei due anni: e per di piu', nei genitori affetti dallo stesso tipo di sordita'. Nei casi di sordita' congenita, le valvole del sistema circolatorio sono simili a quelle dei genitori, anche se questi non presentano sempre sintomi riferibili all'apparato acustico o vestibolare. L'A. suppone che l'influenza ereditaria sia presente anche se i genitori non rivelano disfunzioni cocleari o anomalie vestibolari: al loro posto si potrebbe sostituire un'otosclerosi asintomatica. In taluni casi l'A. propone una terapia destinata a supplire alla deficienza di taluni enzimi. Quando il metabolismo dei carboidrati e' disturbato, puo' essere indicata la somministrazione di fermenti atti a scindere gli idrati di carbonio, aiutando in tal modo anche il ricambio dei grassi. I fermenti lipolitici possono ridurre l'eccesso di colesterina nel sangue e rimuovere i depositi di lipoidi nelle cellule endoteliali dei vasi. Oltre a cio', una dieta appropriata puo' riuscire utile.

Da questo studio sembra risultare che la terapia deve rivolgersi—nei casi in cui gli esami biochimici dimostrano delle anomalie nel metabolismo dei grassi o degli idrati di carbonio—a riequilibrare il ricambio di queste sostanze, domostrando ancora una volta la complessita' delle cause che influiscono sopra la sordita'.

SUMARIO

El autor presenta su estudio de 581 casos de sordera de diferentes tipos, los que demuestran la gran variedad de los factores etiológicos productores de la sordera, del tinito y del vértigo.

Los exámenes bio-químicos de la sangre han revelado, en la gran mayoría de los casos, un incremento de la tara del ácido pirúvico y de la colesterina. Esta alteración bio-química se ha encontrado aún en casos de infantes de menos de 2 años de edad, y es interesante el hecho de que relacionados de estos infantes tambien presentaron esta misma alteración de su quimismo, cuando sufrían de sordera. En general la similaridad de estas alteraciones del quimismo del suero entre el niño y el padre que transmite la herencia de la sordera, se encuentra aún en casos en que dicho padre no revela disfunciones del aparato vestibular o del sonido. Esto sugiere la existencia de otoesclerosis asintomática en estos padres.

Se ha indicado un método terapéutico que corrige la deficiencia catalí tica existente del metabolismo de los hidrocarbonados, y su influencia en el de las grasas. En adición se administran factores lipotrópicos con el objeto de reducir la colesterina de la sangre y favorecer la reabsorción de los depósitos abnormales de lipoides en el endotelio de las arterias y capilares sanguíneos. También se ha recomendado un régimen dietético. Todas estas medidas terapéuticas tienden a la corrección de los procesos bioquímicos alterados por la enfermedad.

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Surgical Management of Malignant Lesions of the Colon

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SURGICAL treatment of malignant lesions of the colon is largely a matter of preparation and of selecting a suitable procedure. All surgeons agree as to the necessity of adequate and painstaking preoperative preparation. There is, however, some honest difference of opinion concerning the most effective surgical procedure, owing chiefly to the individual surgeon's early training and his familiarity with certain methods of approach.

The exteriorization procedure introduced by Mikulicz and standardized and popularized by Rankin and Lahey is effective and sufficiently extensive. It has a wide range of usefulness. It has disadvantages for the obese patient and for the patient with a short mesentery. The principle of resection and primary anastomosis emphasized by Halsted and his followers has a wide appeal and is being more frequently and successfully employed. It is in reality an attempt to reduce the necessity for secondary operation, to remove a larger amount of gland-bearing tissue and to avoid creating a temporary or a permanent colostomy.

Both groups have contributed much to the advancement of surgery of the colon, and their friendly rivalry has stimulated each to greater endeavor. I believe, however, that there is a field of usefulness for each method and that careful individualization determines the most suitable procedure.

Fundamental knowledge of the embryology, anatomy and physiology of the colon is essential to comprehension of the physical characteristics of malignant lesions and to understanding of the symptomatic sequence resulting from them. Acquaintance with the anatomic structure and its concomitant blood supply is necessary for successful surgical removal of these lesions and for reconstruction of the bowel.

The small intestines and the right side of the colon are derived from the midgut and have assumed their normal position by proper and timely rotation. The lymphatic drainage of the right side of the colon extends from the terminal portion of the ileum to beyond the hepatic flexure, converging at a point near the superior mesenteric artery. Therefore, segmental resection of the right side of the colon is inadequate, because not all the gland-bearing tissue is removed.

The blood supply is from the same artery, the superior mesenteric. This actually forms a sharp line of vascular demarcation at the middle or distal portion of the transverse part of the colon, as was demonstrated recently in a case of complete thrombosis of the stem of the superior mesenteric artery. The entire small intestine tract and the right side of the colon up to a definite line of demarcation in the mid-portion of the transverse colon were black and devitalized.

The left transverse colon and the left colon originate from the hindgut and are supplied by the inferior mesenteric artery. Recognition of this vascular distribution is essential to colonic surgery, and extreme care must be exercised in all colonic reconstructions to assure an adequate blood supply at the site of anastomosis. A good arc must be preserved, and no compromise can be tolerated.

The right side of the colon differs anatomically from the left. The cecum has a very thin muscular wall and is capable of extreme distention; progressing distally, the muscular coat gradually becomes more pronounced until the left side is reached. The right side of the colon is larger than the left, and its lumen is greater; the fluid content is semiliquid, and the bowel has the physiologic properties of fluid absorption. In some measure it has many of the physiologic characteristics of the small bowel.

The left side of the colon progressively becomes a cylindric tube for the collection of

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residue and has few of the physiologic properties of the right colon However, in the absence of the right portion it does have the property of adapting itself to some degree of fluid absorption It is largely a tubular structure for the storage of debris It has strong cylindric and longitudinal muscles, adapted for forceful peristalsis and expulsion of contents

Lesions of these two structures therefore are anatomically and fundamentally different, they could hardly be otherwise A lesion of the cecum could hardly grow around the bowel as it does on the left and produce an annular constriction The symptoms of cancer of the colon, therefore varies as to the location of the lesion They are essentially as follows change in bowel habits passing of frequent stools with blood and mucus, bright red blood, change in caliber of the stool, or pregressive bowel constriction with ultimate obstruction

Obstructive lesions act symptomatically like obstructive lesions of the small bowel The pain is periodic, increases in severity and ends abruptly in a climax of pain only to recur shortly Peristalsis may be noted if the abdominal wall is thin and not obese Borborygmus is distinctive by its metallic sound, it occurs synchronously with the abdominal colic Tenderness rarely develops with distention of the proximal portion of the colon This distention is significant of pending rupture at the most distendable portion of the colon, the cecum In this it is like strangulated obstruction of the small bowel The abdomen is not distended symmetrically The distended cecum may be seen and mapped out The roentgenogram shows the distended bowel identified by position and haustral markings An enema of thin barium shows the site of the obstruction

Nonobstructive lesions show characteristic patterns when tested by barium enema depending upon the nature and size of the lesion They are essentially defects in the bowel contour annularity or canalization Defects in bowel regularity result from ingrowing lesions and annularity or canalization from constricting and infiltrating lesions

Segmental study of lesions of the colon will reveal the characteristic differences Lesions of the right side of the colon grow well out into the bowel lumen and produce large ulcerating fungating growths which ooze, bleed and become secondarily infected Hence there is profound anemia resulting from the passage of blood and mucus by frequent stools The lemon colored appearance of cachexia often develops If this is observed to be associated with lesions of the left side of the colon it indicates great extension and probably inoperability Here it is due to the ulcerated and hemorrhagic nature of the lesion and the associated secondary infection Many glands may be present and be benign because of this associated infection Inflammatory reaction and edema may preclude primary resection In spite of the extreme anemia and cachexia rehabilitation can be effected by adequate blood transfusions so that exploration can be safely accomplished

Lesions at the hepatic flexure rarely grow around the bowel and produce annular constriction, but they do, by growth, angulate the bowel and produce obstruction They likewise infiltrate the bowel wall, become fixed posteriorly and laterally by neoplastic extension or inflammation and produce stasis or complete obstruction True obstructive lesions in the ascending colon and hepatic flexure are usually inoperable because of malignant extension or extensive mesenteric metastasis Often edema, inflammation or abscess formation is a complicating factor, distinguishable with difficulty from retrocecal appendical abscess, diverticulitis, tuberculosis or perforating cancer Ileocolostomy adequately detours the intestinal current, so that obstruction inflammation and associated inflammatory fixation subside External drainage of the bowel is not necessary

An end to side ileocolostomy may be done, with closure of the distal end of the ileum, if obstruction is not present If obstruction is present this procedure cannot be done, but a simple side to side ileocolostomy will suffice Care must be taken to prevent any residual opening between the mesentery of the ileum and that of the transverse colon through which small bowel might pass and obstruct I have seen such an obstruction

The essentials of resection and primary anastomosis are uncompromising and definite They are as described by Reichel

1 The patient must be in condition to withstand a more lengthy operation

2 There must be no obstruction, the

proximal bowel must be clean and harbor no accumulated fecal material.

3. The bowel must be viable and the blood supply unimpaired.
4. There must be no tension on the suture line.

Extirpation of lesions of the right colon, even though small, must be extensive because of glandular drainage toward the region of the mesentery. I always remove the entire right colon and up to or beyond the midcolic artery of the transverse colon and preferably do an end-to-side ileocolostomy. I prefer this type of anastomosis because it anatomically approaches the normal ileocecal relationship. Also it necessitates only one blind closed end of bowel, whereas with a side-to-side anastomosis there are two, with two pouches that may become distended with accumulated contents. I have operated upon one enterocele of the blind end of the ileum after an anastomosis of this type. The end-to-end anastomosis presents difficulties due to caliber variation. I consider it inadvisable, though I have done it occasionally.

It is rarely necessary to do a two-stage procedure for lesions of the right colon. I have extended my approach to this problem and now accept for primary resection lesions for which I formerly did a preliminary ileocolostomy. I believe this is due to better preoperative preparation of the patient; cleansing of the bowel, intestinal intubation, blood transfusions, antibiotics and a better technical approach. Technical dexterity is essential; without it a promising condition may end in disaster. I have seen this occur. Technical skill and good surgical judgment come only with experience and are too often gained at the price of many mistakes.

In 27 consecutive right colectomies for malignant lesions I have done no preliminary ileocolostomy. There were no deaths. There were 3 moderately fixed lesions, 1 of which required removal of a portion of the parietal peritoneum and the underlying muscles. In a preceding small series there was one preliminary ileocolostomy deemed necessary because of infection, edema and fixation, which was subsequently resected.

Obstructive lesions of the transverse should be decompressed by cecostomy and later resected, bowel continuity being reestablished by end-to-end anastomosis. Resection and primary union should never be attempted in the presence of even a slight obstruction, as contamination of the proximal bowel and caliber dimensions preclude success. The maximum of primary colonic surgery is an absolutely nonobstructive clean bowel, and this is uncompromising. If the bowel is scrupulously clean, open anastomosis can be done safely with a mortality no greater than with the closed type of anastomosis or the obstructive type of Mikulicz resection.

It cannot be too strongly emphasized that the most important feature of any primary bowel resection and anastomosis is that an adequate and unimpaired blood supply be maintained. A clean bowel and accurate suture approximation are essential but without blood supply they avail nothing. A free and abundant blood supply can compensate to some extent for other inadequacies. but no amount of meticulous care can compensate for blood deficiency. All factors must be favorable for successful primary colonic resection and anastomosis. Obstruction, fixation and infection are distinct contraindications. Obstruction itself badly damages the consistency, tone and viability of the bowel wall. An edematous. hypertrophied bowel cannot be securely anastomosed.

Sulfa medication is unquestionably helpful but is ineffective in an unclean bowel. I clean the bowel thoroughly, give sulfasuccidine or sulfa thialadine for five to seven days and administer 2 to 4 Gm. of streptomycin two days prior to operation.

Fixation definitely affects the thoroughness and safety of mobilization, and adjacent structures may be seriously damaged in the process. The problem of infection, perforation or abscess formation adds to the danger of local contamination and dissemination of infection.

SPLENIC FLEXURE

Lesions of the splenic flexure are usually of a slow progressive obstructive type, and the early symptoms are referred to other parts of the gastrointestinal tract, remote from the primary lesion; therefore the diagnosis is rarely made until obstruction occurs. The lesion is high under the costal arch and is not palpable until it reaches a considerable size The proximal limb of the splenic flexure is often superimposed upon the distal limb and an anterior posterior view after a barium enema may be misleading and reveal no lesion, while an oblique view may show a definite defect Abscess perforation and fixation are common Surgical approach is difficult anatomically especially if the patient is obese Moderate obstruction is frequently present and preliminary cecostomy is necessary Because of the difficulty of evaluating the local situation in lesions of the splenic flexure, proximal colonic drainage (cecostomy before resection and primary anastomosis is not to be condemned A moderate obstruction is best handled by an obstructive Mikulicz type of procedure with subsequent closure and not by resection and primary anastomosis Resection of a wide segment of the mesentery is essential, and removal of glands deep in the abdomen must be carefully done lest vascular damage be inflicted on major vessels

DESCENDING COLON AND SIGMOID

Lesions in these areas of the colon are usually annular and more or less constrictive When first observed they show varying degrees of obstruction, from chronic subclinical to complete Fortunately, most apparent obstructions are not complete neoplastic closures but are in part due to edema inflammatory reaction and the invagination of mucous membrane into the meager neoplastic lumen With proper surgical decompression and irrigations they relent sufficiently so that a clean bowel can be obtained and resection and anastomosis done with safety Proximal surgical decompression can be done by cecostomy or by colostomy of the transverse colon the latter being preferable However in cases of complete obstruction with extensive proximal bowel distention this is not always easy Often the distended right transverse colon is forced high under the liver by the enormously distended cecum, which pushes everything well toward the midline and upward, so that the transverse colon is unapproachable In surgical decompression I have found it often better to deflate the cecum by needle puncture and aspiration and insert a tube, or to exteriorize a small segment, than to attempt isolation of an inaccessible distended transverse colon True it is harder to cleanse the colon of its accumulated contents after a cecostomy than after a transverse colostomy but it is often safer when the bowel wall is enormously dilated and paper thin The danger of rupture is too great to permit manipulation The bowel can be cleansed successfully through a cecostomy and it can also be satisfactorily decompressed, although it may take longer Complementary cecostomy or colostomy accompanying resection and primary anastomosis of the left colon or the sigmoid flexure is not to be condemned It is commonly practiced by many capable surgeons It provides a vent for accumulated gas and prevents tension on the suture line The subsequent closure is a small procedure The added security is well worth the minor inconvenience

The point of greatest clinical interest is that colonic obstruction is a closed loop obstruction and is subject to gangrene and perforation when the intracolonic pressure equals or exceeds the systolic blood pressure No blood can then reach the antemesenteric portion of the distended cecum, and localized gangrene and rupture develop I have observed this twice In 1 case it developed during preparation for cecostomy The cecostomy however, was immediately carried out, and fortunately there was little abdominal soiling from the disseminated gas Recovery occurred and subsequent resection of the lesion was successfully done Colon obstruction is comparable to strangulated obstruction of the small bowel as no bowel contents flow back into the terminal part of the ileum and the blood supply ultimately becomes obstructed Therefore surgical decompression should not be long deferred lest gangrene and rupture of the cecum take place

RECTOSIGMOID

As has been mentioned by Gilchrist and David, the anatomic classification of the rectum rectosigmoid and lower sigmoid is not very clear The rectosigmoid is hard to define The excised specimen shows no such anatomic structure These authors describe that portion below the pelvic peritoneum as “extraperitoneal carcinoma’ of the rectum and that above and below the promitory of the sacrum as "intraperitoneal carcinoma."

The lesions are constrictive and frequently obstructive, requiring colostomy as a preliminary procedure, preferably of the right transverse colon. Subsequently the anterior type of resection can be done if local conditions are favorable. If the lesion is large or fixed, or if metastatic glands are observed, abdominoperineal resection offers the best chance of removing the involved tissue.

Lesions below the pelvic peritoneum are often not suitable for excision and bowel reconstruction. The problem always is, can all of the cancer be removed and can two ends of the bowel be sewed together successfully? This has been emphasized by Gilchrist and David. Large tumors with involved lymph nodes and distal metastases may be present but unrecognized. The most radical precedure is advisable and can be anatomically accomplished only by abdominoperineal resection. However, anterior resection and anastomosis has a definite place, and, for lesions at or just below the pelvic peritoneum, wide removal of gland-bearing tissue can be accomplished and sufficient bowel below the lesions removed to assure of retrograde malignant extirpation. I myself am approaching this problem more and more by this procedure. Time, however, will be required to establish its actual merit.

SUMMARY

Malignant lesions of the colon are discussed from the point of view of anatomy, pathology and operative technic. The author stresses the importance of maintaining an adequate blood supply and meticulous surgical technic in the various operations described.

RÉSUMÉ

La discussion porta sur les lésions malignes du colon au point de vue de l'anatomie, de la pathologie, et de la technique opératoire. L'auteur souligne l'importance du maintien d'un apport sanguin proportionné et d'une technique chirurgicale minutieuse dans les diverses opérations décrites.

SUMARIO

Se han discutido las lesiones malignas del colon bajo el punto de vista de la anatomía, de la patológia y de la técnica operatoria. El autor da énfasis a la importancia de mantener una circulación adecuada y del cuidado que se debe de tomar en la ejecución de las diferentes técnicas quirúrgicas que han sido descritas.

RIASSUNTO

Discute i tumori maligni del colon dal punto di vista anatomico, patologico e chirurgico. Sottolinea l'importanza di una tecnica precisa, meticolosa, nell'esecuzione dei vari tipi d'operazione, attribuendo una notevole importanza al mantenimento di un'adegnata vascolarizzazione.

Extrapleural Pneumolysis with Methyl Methacrylate (Lucite) Plombage

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IN 1828 William Carson suggested the first mechanical aid in the treatment of pulmonary tuberculosis, i.e., pneumothorax. In 1882 Forlanini re-suggested its use; his first paper was published in 1892. However, the suggestion was practically lost until 1896 when J. B. Murphy revived it. In 1908 Brauer and Spengler published the results of several years' work and by 1918 pneumothorax was well recognized. In the meantime, however, a need for other mechanical procedures was seen because of failures in certain pneumothorax procedures. The resultant technics of phrenic paralysis, pneumolysis, thoracoplasty, lobectomy and pneumonectomy were slowly developed.

Thoracic surgery received its greatest stimulus after World War I when, with certain advances in anesthesia, it was found that surgeons could operate on the chest without having the patient in a pressurized cabinet. Some of the world leaders in this field of surgery were Stuertz, 1911 (phrenic nerve crush), Quincke, 1888, Spengler, 1890, and later Brauer, Friedrich and Wilms. Still later Graham of St. Louis and Dolley of Los Angeles showed the way to successful lobectomy and pneumonectomy.

In 1891 Tuffier introduced extrapleural pneumolysis. His method of holding the space produced by operation was the frequent introduction of air. Sauerbruch I believe gives this distinction to Schlange. Since Tuffier's time surgeons interested in the treatment of pulmonary tuberculosis have been seeking a plombage of nonirritating material to maintain the lung in a collapsed state. The results of plombage with such agents as fat, paraffin, hydrostearolein, rubber, muscle transplant, air and even gauze have been poor. Paraffin has been used to a greater extent than any other agent. Among the outstanding Europeans who have pioneered in its use are R. Nissen of the University of Istanbul, Gosta Lundh of Sweden and McIndoe, Steele and Alexander of the University of Michigan.

Nissen in his review of extrapleural pneumothorax states that thoracoplasty and its various modifications and plombage are superior to extrapleural pneumothorax. He lists the following causes of danger in instituting an extrapleural pneumothorax: massive hemorrhage, infection of the exudate in the space, perforations of cavities and slipping of the paraffin plombage.

Gosta Lundh has reported 37 cases in a ten year experience with unsatisfactory results in the use of extrapleural pneumothorax and paraffin plombage. He recommends thoracoplasty in stages combined with temporary plombage as described by Walter Schmidt as the method of choice.

In 1930 McIndoe, Steele and Alexander of the University of Michigan reported their experience with paraffin as a plombage. They were convinced that "extrapleural paraffin pneumolysis is an effective operation and that it is indispensable in certain patients in whom all other surgical procedures are contraindicated." They also expressed the opinion "a considerable operative mortality has been avoided in a group of poor risk patients who would otherwise have been subjected to thoracoplasty."

Others who have written extensively on their use of paraffin as a plombage are Brunner, Kremer, Vidakovits, Sebestyen, Jonnides, Minas and Schlack and A. R. Judd—all with varying degrees of favor or disfavor of the procedure.

Geller in 1938 introduced a new plastic material for use in dental prosthesis. Chemically this material is known as methyl methacrylate. It is the result of years of intensive chemical research. For several years prior to 1938 it was used by commercial plastic manufacturing companies and marketed under such

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From the Abbott Clinic, Ontario, Calif.

trade names as lucite, plexiglas, vitarilic, etc. Methyl methacrylate is an acrylic resin, chemically compounded under exacting chemical and physical specifications, from acetone, hydrogen, cyanide and methyl alcohol in the presence of sulfuric acid. The polymerized form is a clear, light-weight solid which softens at 105 C. and can easily be molded into any shape. Its tensile strength is an outstanding physical characteristic. Spherical masses 1 inch in diameter are said to withstand 700 to 900 pounds of weight, whereas methyl methacrylate, in the finished form, has a tensile strength of 6,000 to 9,000 pounds per square inch. Chemically it is relatively inert; it is soluble in esters, ketones, chloroform, ethylene, dichloride and strong acids, but is not affected by weak acids or alkalis. It absorbs very little water, does not change its chemical composition and does not appear to deteriorate like other plastic materials which have been implanted in the human body.

The effects of methyl methacrylate used to repair cranial defects in experimental animals were studied by Kleinschmidt in 1940. He found remarkably little inflammatory reaction and no foreign body response like those characteristic of other foreign agents. The results of his work have been confirmed by others. During the first few days the plastic plate is surrounded by a small amount of serum, which rapidly becomes organized, forming a thin film of hyaline connective tissue. Rarely does sufficient serum accumulate around the implant to require aspiration. This fact has been stressed by Gurdjion and his co-workers as well as by Kahn, Woolf and Walker, who have used methyl methacrylate successfully in human cranioplasties. Woolf and Walker describe a patient with an infected wound that cleared up with penicillin and local treatment without removal of the plate. Kahn expressed the opinion that this material is so inert that it may be used in the primary repair of perforating wounds of the head. Spealman, Main, Hoag and Larson, working with experimental animals, allowed the material to remain nine months after implantation in the peritoneal cavity. At autopsy he noted encapsulation of the particles by a thin film of hyaline connective tissue, without formation of adhesions.

Methyl methacrylate has been used clinically to repair cranial defects and to study the brain and the pial circulation. It has been used successfully in reconstructive surgery as a substitute for cartilage, in the correction of facial deformities (Penhal Brown) and in arthroplasty for osteo-arthritis (Harmon). It was first used experimentally to secure a pulmonary collapse by Wilson and Baker in 1944. "The effects of this plastic material inserted into the pleural cavity of thirty rats and into the extrapleural space of ten dogs, was studied. A collapse of individual lobes was secured in approximately one-half of the rats by inserting into the pleural cavity a portion of the plastic, re-molded into the shape of the lobe to be collapsed. In the other one-half of the rats, the pleural cavity was filled with small ¼ inch balls. None of the animals showed any systemic reaction and tolerated the material well. X-rays taken at frequent intervals following the operation showed little evidence of pleural effusion. Autopsies performed at intervals of from 10 days to 8 months showed only slight inflammatory changes and no foreign body reaction. The balls were surrounded by a thin serum immediately following the operation, and the pleura showed minimal thickening and infiltration with eosinophilia. The balls became encapsulated by a thin layer of hyaline connective tissue in the majority of the animals. The adjacent lung showed little evidence of reaction or atelectasis as a result of compression."

In our series of cases we have found that methyl methacrylate, in addition to being nonirritating to the tissues, possesses certain definite advantages over other foreign materials that have been advocated for plombage. The material is light-weight, and a large quantity can be introduced without danger of penetrating the pleura or the thin-walled cavities. It is radiotranslucent and does not interfere with the interpretation of roentgenograms. Both of these factors are of great importance in thoracic surgery.

We have used molded methyl methacrylate hollow balls 1 inch (2.5 cm.) and 1½ inches (3.7 cm.) in diameter. With balls of this size it is easy to fill pockets of various sizes developed in the extrapleural procedure. We have used 50 balls in a single patient without ill effects. Others have reported the use of 60 balls with no ill effects. One patient remarked that she felt for a few days as though she had had a little too much air at a pneumothorax refill. As the air around the balls is absorbed, serum accumulates around these spheres. This serum becomes organized into hyaline connective tissue, maintaining the lung permanently in a collapsed state.

TECHNIC

The operative procedure consists of an anterior or a posterior incision. The anterior incision follows the anterior axillary line below the superior border of the pectoral muscles downward lateral to the breast for about six inches. The belly of the pectoralis major may be incised or retracted. The third rib is exposed and a section of 2½ to 3 inches is removed after removal of the periosteum with care not to lacerate the parietal pleura. The pleura is carefully dissected off the chest wall to the extent desired for the collapse. The methyl methacrylate spheres (balls) have been sterilized by soaking in zephiran chloride 1:10,000 dilution for twenty four hours. The extrapleural space is dried and the spheres are inserted into it until it is filled. The balls should not be pressed into the space so that they are tight—enough room must be left so that they may move with the downward and upward motion of the lung. If the space is packed too snugly, the patient may complain of pain in the arm from pressure on portions of the brachial plexus. The intercostal muscles are sutured with interrupted sutures. The rest of the wound is closed without drainage.

The posterior approach is made by an incision paralleling the spine just medial to the border of the scapula. The rhomboid muscles are divided, the posterior portion of the third rib is isolated and stripped of its periosteum for about 2½ inches. The technic of separating the parietal pleura is the same as in the anterior approach, but we prefer the posterior incision because of the proximity of the mediastinum and the greater ease of dissecting the parietal pleura in this region. Closure of the wound is made without drainage.

We have used streptomycin (1 Gm.) and penicillin and sulfa crystals (5 Gm.) locally in the wounds in about one half of our cases. The other patients have received streptomycin 1 Gm. daily and penicillin 50,000 units every four hours intramuscularly, and we are unable to see any difference in the reactions of the patients to the two procedures.

This operation has a number of advantages. 1. Operation can be performed with local anesthesia. 2. There is little or no shock or blood loss and transfusions are rarely required. 3. The involved area of lung can be selectively collapsed so that the function of normal lung tissue is preserved. This makes possible the successful treatment of patients with bilateral apical cavities, low vital capacity, and the like. 4. There is no mediastinal shifting after operation. Expectoration of sputum is easy and there is little danger of bronchogenic spread. 5. Postoperative management is relatively easy. 6. There is no chest deformity or scoliosis.

INDICATIONS

The indications for extrapleural plombage with methyl methacrylate are limited since the use of this material in thoracic surgery is still in the experimental stage. The indications, however, are much broader than those established for extrapleural pneumothorax. All but 4 of the patients for whom this procedure was used have been under a strict sanatorium regimen and pneumothorax has been attempted and found unsuccessful. Recent spread does not constitute the same contraindication to this operation as it does to thoracoplasty. Many patients not suitable for either thoracoplasty or resection can be successfully treated by this method.

Patients considered most suitable for the operation are:

1. Patients with bilateral cavities.
2. Patients with unilateral cavities and infiltration in the opposite lung.
3. Patients in whom the pulmonary tuberculosis is complicated by asthma, diabetes, heart disease or low vital capacity.
4. Patients of advanced age who, because of their general physical condition, are not candidates for major surgical procedures.
5. Patients in whom thoracoplasty has been performed without successful closure of the cavity. Extrapleural stripping of the apex of the collapsed lung and plombage offers these patients a single stage procedure with local

anesthesia, with little or no shock and with a good chance of cavity closure.

6. Patients with a thoracoplasty on one side, in whom a cavity has developed in the opposite apex.

7. Patients with cavities in the basal portion of the lung. In these patients, extrapleural pneumolysis and plombage of the lower lobe permits a selective collapse and preserves the function of the uninvolved upper lobe.

COMMENT

Extrapleural pneumolysis is based on sound surgical principles. Adequate collapse of the lung can be secured by this method as by intrapleural pneumothorax or thoracoplasty. Entrance into the extrapleural space probably occurs during the course of most thoracoplasties and is attended by little, if any, increase in danger to the patient. Many present-day thoracic surgeons routinely combine extrapleural apicolysis with thoracoplasty.

COMPLICATIONS

Complications of extrapleural pneumolysis and plombage with methyl methacrylate may be divided into two groups; namely, those arising as a result of the operative procedure, and those attributed to the use of methyl methacrylate. The first group includes (1) accidental rupture into the lung or a thin-walled cavity; (2) hemorrhage into the extrapleural space; (3) formation of a bronchopleural fistula; (4) tuberculous or secondary infection in the extrapleural space; (5) cardiac failure due to diminution of the pulmonary circulatory bed; and (6) pressure necrosis of the viscera and the visceral pleura.

The second group includes (1) brachial neuritis, due to too great a number of balls in the space, and (2) wandering of a ball out of the space owing to a rent in the pleura.

At this writing we are reporting 18 cases. In 13 we performed an extrapleural pneumolysis of the apex of the lung, and in 5 cases we operated for revision of a thoracoplasty. Ten of the patients were women, and 8 were men. Thoracoplasty revisions were performed on 2 of the former and on 3 of the latter group. In the case of 1 man the operation was performed extrapleurally on the apex of the right lung. The balls were removed the second day after operation owing to torn pleura, severe emphysema and a bronchopleural cutaneous fistula, which is now healing as after a Monaldi procedure.

The ages of these patients varied from 28 to 60 years. All had had bilateral lesions at some time previously, or at present. In 1 case, a man was operated on for the second time six months after the first pneumolysis and 17 spheres were added after extending the dissection of the parietal pleura. He had reopened his previous cavity and, two months after the second operation, had a normal sputum; and in three months, a normal gastric wash. The average time required to convert the sputum to normal was three months. In 11 cases gastric lavage now gives normal results, and in the remaining 7 cases, 5 have been done within the past sixty days, and two show rare bacilli in the sputum, 3 as negative to smears of the sputum. In 2 cases the sputum is not yet normal but has been reduced in quantity by 75 percent and is clear most of the time. The sedimentation rates in these cases compare favorably with that observed for thoracoplasty, varying from 18 to 40 mm. per hour.

The number of spheres (balls) inserted depends upon the size of the chest cavity and the extent of the pneumolysis. In our series it varied from 9 to 50 balls. Thoracoplasty revisions required only a small number of balls —about 8 to 10 on the average.

All, but one of these procedures have been successful to the time of writing. One patient had brachial neuralgia, which disappeared in ninety days with no paralysis of the arm or hand. This individual was an emaciated woman who gained 30 pounds in four months after the operation.

REPORT OF CASES

Case 1—A woman aged 41 was first seen in 1943 during a second breakdown (she had had one four years earlier). She was hospitalized, and sandbags were put over the affected area. There was hemorrhage from the apex of the right lung, and after eighteen months of bed rest the patient made uneventful progress and the sputum became negative from seventy-two hour concentrations. After two gastric lavages had given normal results she was dismissed from the hospital and resumed her daily routine.

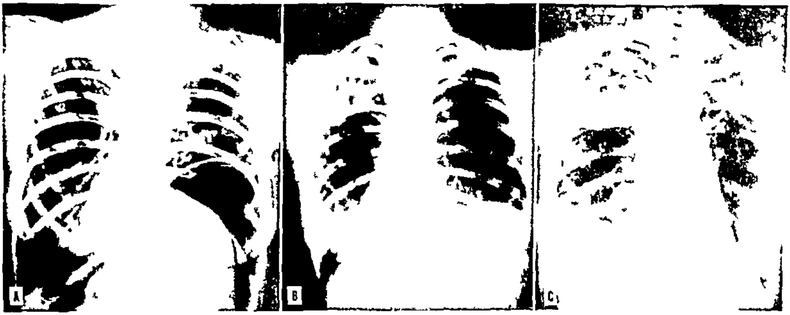

Fig 1.—A, preoperative roentgenogram in Case 1. B, roentgenogram taken at first operation (Oct 22, 1948). Fourteen balls of lucite (methyl methacrylate) were used. C, roentgenogram taken at second operation (March 28, 1949) at which 23 balls were used.

Records were kept of her progress until 1946 and then were discontinued until the summer of 1948. She was having a profuse hemorrhage from the left pulmonary apex. Some ten years ago, she had a permanent phrenic of the left side and noting the history of this phrenic pneumoperitoneum was started immediately and the hemorrhage was controlled. About two weeks later there was hemorrhage from the right apex but the attempt to control it was unsuccessful. A pneumothorax was instituted which stopped the hemorrhage within a few hours but it had to be discontinued after ten days because of severe dyspnea. After discontinuance of the pneumothorax the hemorrhage did not reappear but direct smear tests of the sputum gave positive results and an area of infiltration combined exudative reaction and fibrosis with a 2 cm cavity under the clavicle (Fig 1A). Percussion over this area showed marked dullness as far as the second rib anteriorly and the fourth rib posteriorly. Moist crepitant rales were present constantly in this area.

Owing to the prolonged period of activity an extrapleural pneumolysis was performed on Oct 22, 1948 (Fig 1B). Fourteen lucite balls were inserted into the extrapleural space at the time of operation. The patient's cough and sputum were reduced 50 percent. Ninety days after the operation, however, the sputum still gave markedly positive results for tubercle bacilli. Bronchoscopic examination revealed positive smears from the upper lobe of the right lung.

The second extrapleural pneumolysis was performed on March 28, 1949 and twenty three lucite balls were inserted. There was little postoperative reaction and no dyspnea (Fig 1C).

The patient had no cough and did not produce any sputum since the second week after the second operation and gastric lavage six weeks after operation was negative to smears and culture.

The patient gained 10 pounds toward her average normal weight and at the time of writing is entirely symptom free. However, it should not be understood that she is entirely normal as repeat gastric lavages are still to be done.

Case 2.—A woman aged 38 had an eight year history of bilateral pulmonary tuberculosis with cavitation in the upper lobe of the right lung. A lesion on the left lung had been cleared by previous bed rest, but three cavities in the upper lobe of the right lung had not responded to eighteen months of pneumoperitoneum which was employed after failure to produce a pneumothorax.

An extrapleural pneumolysis of the right upper pulmonary lobe was performed with removal of 3 inches of the third rib posteriorly. The pleura was dissected down to the fifth rib posteriorly and 13 lucite balls were inserted after which the wound was closed.

The patient was symptom free with no cough and no sputum one week after the operation. Gastric lavages at six weeks and four months gave negative results in smear, culture and guinea pig tests.

Case 3.—A man aged 26 had moderately extensive bilateral tuberculosis with a large cavitation in the upper left pulmonary lobe and pathologic sputum. Bronchoscopic examination revealed moderate tracheal bronchitis with practically all of the secretions from the left upper bronchus. Lesions throughout the upper and middle lobes of the right lung were of the fibrocaseous type, with very heavy

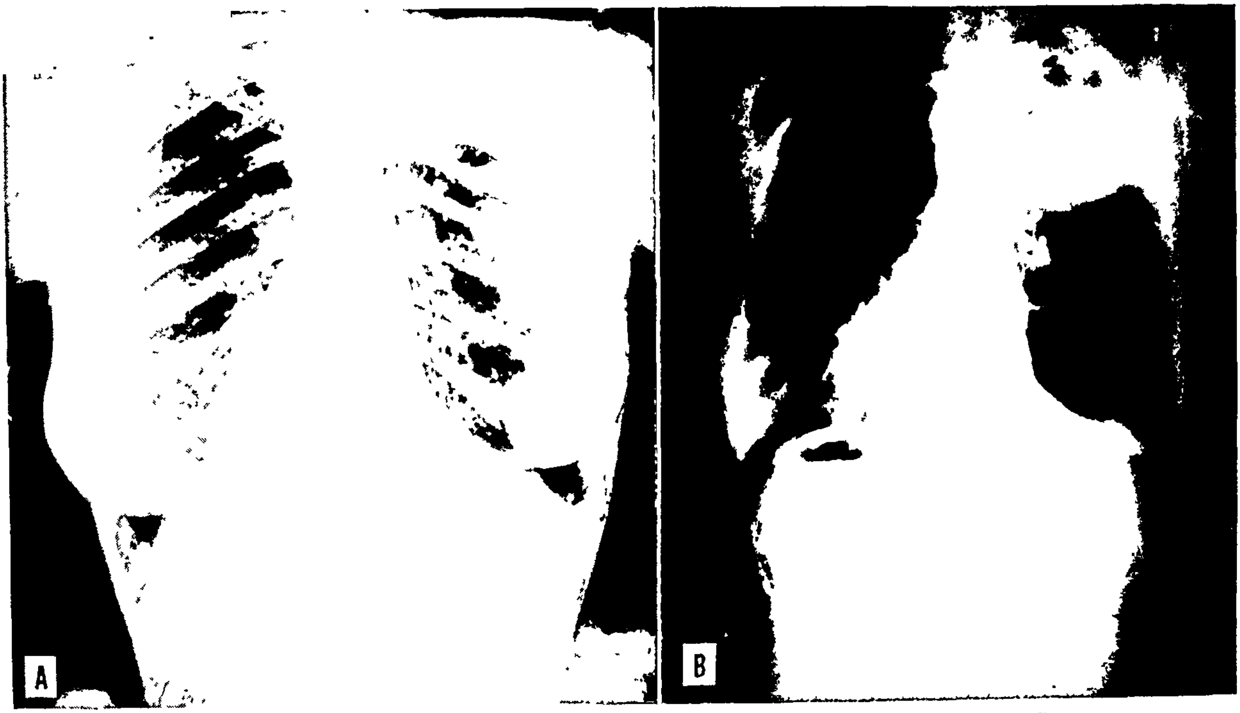

Fig. 2.—Preoperative (*A*) and postoperative (*B*) roentgenograms of patient in Case 2.

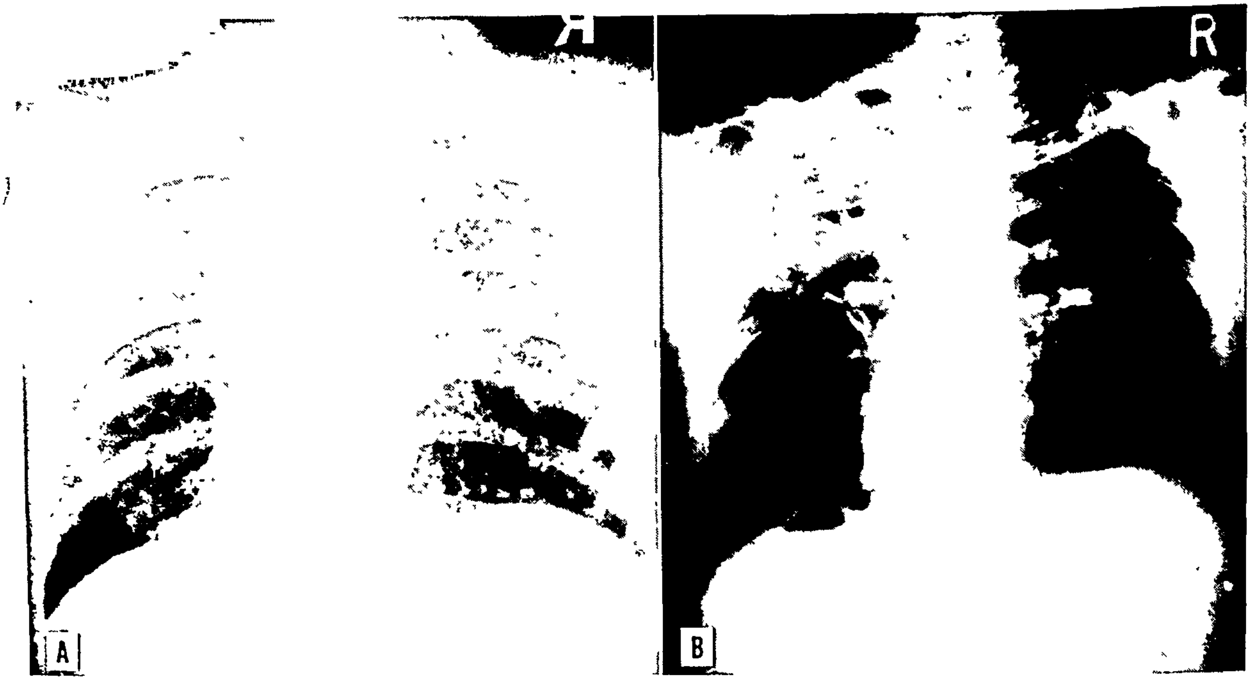

Fig. 3.—Preoperative (*A*) and postoperative (*B*) roentgenograms of patient in Case 3.

peribronchial markings. In spite of the large cavity in the upper lobe of the right lung, extrapleural pneumolysis was performed with removal of 3 inches of the third rib posteriorly. The pleura was dissected easily with a minimal amount of bleeding. Twenty lucite balls were inserted. The patient's productive cough subsided within two weeks. Direct smears of the concentrated sputum gave negative results in six weeks, and gastric lavages taken at four and six months postoperatively gave normal results on smear, culture and guinea pig tests A roentgenogram of the chest taken eight months after the operation revealed no spread of the disease in the left lung, and the perihilar region had returned to normal The small scattered exudative areas throughout the right side of the chest had disappeared and showed only scattered scarring

Due to the cavity's size in the left upper lobe, we felt that this was a border case to proceed on, but owing to the spread of the disease from this area, we felt that this procedure was less hazardous than thoracoplasty

COMMENT ON CASES

These 3 cases are typical of the cases selected At the time of writing, it has been necessary to remove the lucite balls in only 1 case in which removal took place forty eight hours after the operation because of massive emphysema due to a tear in the pleura posterior near the mediastinum However, this lesion of the chest wall has closed slowly and has kept about 80 per cent of the collapse produced at the initial operation

SUMMARY

The use of methyl methacrylate plombage is still in the experimental stage, as it is only three and one half years since the first work was done by Wilson and Block However, the author's own patients have shown such favorable results as to warrant a continuance of the procedure The cases must be selected carefully, and, if one of the less severe procedures can be instituted, it should be used in preference to methyl methacrylate plombage Extrapleural pneumolysis with this plombage in many selected cases may be used instead of one stage or two stage thoracoplasty, to prevent the deformity that follows the latter operation, and it may be used to control cavities that have not closed after a previous thoracoplasty

The procedure warrants further study, with variation in the size of lucite balls or a plastic material of some other shape, such as a bag or sponge, in an attempt to overcome the disadvantage of pressure necrosis Some of this change in shape of material and its effect on experimental animals (e g , sponge) has been reported with favorable results, by Dr John B Grow, Director of Surgery at the National Jewish Hospital of Denver, Colorado

Recent reports of many surgeons show that the complications formerly associated with paraffin plombage (especially secondary infections) are not as frequent as heretofore Continued search in the field of plastics may result in a method devoid of the complications of necrosis and secondary infection In view of the fairly high percentage of arrested pathologic processes noted in recent literature, and the few complications, the procedure must not be discarded

RESUME

L'emploi du plombage au methyl methacrylate est encore au stade expérimental et il y a seulement 3 ans et ½ qu'a paru le premier travail fait par Wilson et Block Cependant les propres malades de l'auteur avaient eu des résultats si favorables que cela justifia la continuation de l'emploi de ce procédé Les cas doivent être soigneusement triés et si un procédé plus bénin peut être institué on doit se servir de préference du plombage au méthyl méthacrylate Dans beaucoup de cas on peut employer la pneumolyse extrapleurale avec ce plombage au lieu de la thoracoplastie en un ou deux temps pour éviter la déformation qui suit la dernière opération, et elle peut être employée pour obturer des cavites qui n'avaient pas éte fermées apres une thoracoplastie antérieure

Le procedé nécessite d'autres investigations telle que la variation de dimension des balles transparentes ou de matériel plastique ayant une autre forme tel qu'un sac ou une éponge pour essayer d'éviter l'inconvénient de la necrose par pression Quelques un de ces changements dans la forme du matériel et ses effets expérimentaux sur les animaux (par ex l'éponge) ont éte decrits avec des resultats favorable par Dr John B Grow Directeur de la Section Chirurgicale a l'Hôpital Juif Nationale de Denver, Colorado

Les rapports récents de plusieurs chirurgiens montrent que les complications qui auparavant suivaient le plombage de paraffine (particulièrement les infections secondaires) ne sont pas aussi fréquentes qu'auparavant

Les recherches continues sur les plastiques pourront avoir comme résultat la mise au point d'une méthode à l'abri des complications de nécrose et d'infection sécondaire. Si l'on considère le pourcentage, relativement élevé, des processus pathologiques arrêtés dans leur évolution, que l'on rencontre dans les publications récentes, et leur peu de complications, on doit continuer à employer ces procédés.

SUMARIO

El uso del plombage de metacrilato de metilo està aun en la etapa experimental, pues solamente han pasado 3 años y medio desde su introducción por Wilson y Block. Sin embargo, lòs resultados obtenidos por el autor de este papel han sido tàn favorables, que en sù opinión este método de tratamiento merece su continuación. Los casos deben de ser seleccionados con cuidado y su uso no debe de suplantar los métodos menos radicales. Este metodo de plombage en combinación con la neumolisis extra-pleural, en casos seleccionados, se podría usar en preferència á la toracoplastía, cuando se quiren prevenir las deformidades que subsiguen al último procedimiento y también se podría usar para controlàr las cavidades que no han respondìdo á la toracoplastía.

Este procedimiento de plombage merece más estudio en relación con el tamaño de las bolas de lucite o de otro material plástico de otra forma, tal como bolsas oc sponjas, con el objeto de eliminar lo más posible las necrosis por presión. Dr. John E. Grev, Director de Cirugía del Hospital Nacional Judío de Denver Colorado, ha reportado buenos resultados en sus animales experimentales, cambiando la forma del material (ej. esponja).

Los reportes recientes de muchos cirujanos revelan que las complicaciones que anteriormente se presentaban con el plombage de parafina (especialmente la infección secundaria) no son tan frecuentes. La investigación en el campo de materiales plásticos pueda que con el tiempo produzca un método que esté libre de las complicaciones de necrosis y de infeccioñes secundarias. En vista del porcentaje elevado de los casos patológicos que han sido arrestados por este tratamiento, segun la literatura, y de las pocas complicaciónes que se han notado en estos casos, este procedimiento no debe de descartarse.

RIASSUNTO

L'uso di metil metacrilato per ricolmare cavita' polmonari e' tuttora nella fase sperimentale: non sono passati che 3 anni dal primo lavoro di Wilson e Block. I risultati conseguiti dall'A. sono pero' cosi' buoni, da giustificare una piu' larga adozione di questo nuovo materiale. I casi clinici vanno selezionati accuratamente e se una tecnica operativa piu' semplice puo' essere adottata, e' preferibile sostituirla a quella che richiede l'uso di metacrilato. Una pneumolisi con questo materiale puo' essere eseguita invece della toracoplastica in una o due tappe, onde prevenire la deformita' che conseguono a quest'ultima operazione, oppure per richiudere delle cavita' che non si sono cicatrizzate dopo una precedente toracoplastica. Per ovviare agli svantaggi della necrosi da compressione, bisogna variare il volume della palla di lucite o di altri materiali plastici, tenendo anche conto della forma di questo materiale (spugne, sacchetti, ecc.). Gli effetti di queste variazioni sopra gli animali da esperimento sono stati illustrati recentemente da Grow, Direttore del reparto Chirurgico dell'Ospedale Nazionale Ebraico di Denver, Co. L'uso della paraffina quale materiale da riempimento appare meno temibile, specie in rapporto al pericolo di infezioni secondarie, di quanto sembrasse nel passato.

Ulteriori indagini nel campo delle materie plastiche offriranno probabilmente al chirurgo il mezzo per evitare sia infezioni, sia necrosi. I risultati conseguiti in questi ultimi tempi dimostrano un'alta percentuale di arresto del processo infiammatorio: occorre quindi perseverare in questo nuovo indirizzo terapeutico.

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Experimental Studies on Vascularization of Bony Calluses

STEFANO TENEFF, M.D., F.I.C.S.
TURIN, ITALY

IT IS well known that the most important histologic elements in the formation of bony callus are osteoblasts and vascular proliferation; the interstitial connective tissue participates but little. In the past numerous experimental studies have been carried out to ascertain the origin of the osteoblasts in the bony callus, but now it can be said with certitude that they arise from well defined cellular elements that do not share in the primitive ossification process, remaining in the bone in an indifferent state but still retaining the capacity for regeneration as bone tissue if circumstances warrant.

Further, it is known that osteoblasts, which can be found in any bone, are particularly plentiful directly under the periosteum, where they lay down a distinct stratum adherent to the internal surface. During the proliferative process at the site of the bony callus, the osteoblasts follow the newly formed vessels and distribute themselves about them. It follows, therefore, that vascularization phenomena are of the utmost importance in the evolution of callus. This has been studied in the physiology laboratory by means of ordinary methods of staining that reveal the endothelium of the blood vessels, but these researches are insufficient, because they do not permit direct vision of the origin and distribution of the vascular granulation tissue, and they have been subject to false interpretation.

It was therefore my desire to take up the experimental study of this problem by a new method which I suggested to the histologist, G. Rosso, which enabled me to delineate the presence of vessels in the bone and in the callus. This method represents a marked improvement over the old method of Krogh, which consists of the intravenous injection of india ink, diluted in Ringer's solution, into live animals; but the vessels are not always well revealed by this technic, because of histologic technicalities, and yield only an imperfect reproduction of the vascular pattern. The new method consists of treating the bone, after decalcification, with a concentrated formic acid solution, which, without altering the aspect of the vascular net of the bone after the injection of india ink, transforms the bone substance into such a transparency that micrometric sections become useless. Thirty-five cc. of a solution consisting of 80 parts india ink to 20 parts Ringer's solution is injected into the abdominal aorta of a live rabbit. This permits the vascular bed of the hindlimbs to become filled with the ink. The rabbit is killed after the injection. The limb, with its soft tissues, is fixed in solution of formaldehyde for four hours, washed rapidly in distilled water, and decalcified for ten hours in 10 per cent aqueous solution of concentrated nitric acid. The decalcified piece of bone is then sectioned in two equal parts along its long axis so as to obtain a rectangular section from the tubular bone, which is again washed in distilled water and immersed in a concentrated solution of formic acid for two hours. After repeated washings in absolute alcohol and xylol the slides are mounted in Canada balsam.

Examination of the normal bone slides enables one to observe clearly all the details of the vascular pattern, which is very rich. The vessels are essentially rectilinear and parallel to the long axis of the bone. An impressive number of anastomoses unite the vessels in all directions, regardless of caliber, thus aiding materially to increase the vascularity of the network.

In a series of 21 rabbits with artificially produced fractures of the middle third of the shaft of the femur, sections were taken by the aforedescribed technic after five, ten, twenty, thirty, forty, seventy and one hundred and forty days. The surrounding soft tissues were studied with the callus, and the entire formative process

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From the University of Turin Medical School, Department of General Surgery.

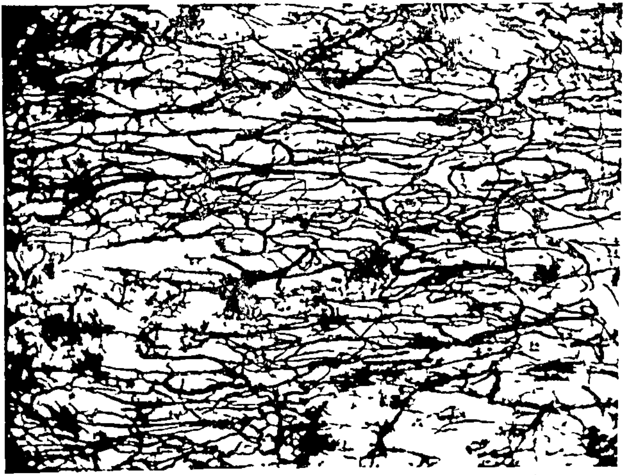


Fig. 1. Vascular network of normal bone. Observe the predominantly rectilinear course parallel to the axis of the bone. Note also the extraordinary abundance of anastomoses. The vessels are of variable caliber.

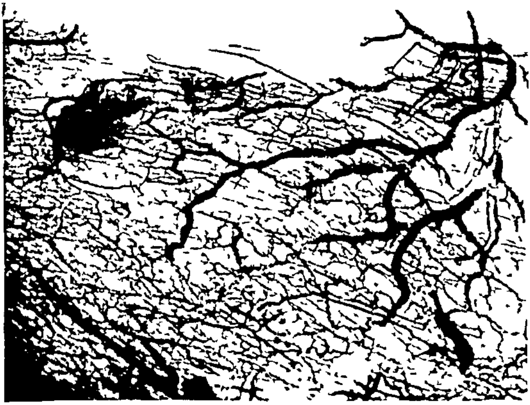


Fig. 2. Evolution of vascularization of bone callus. Note penetration of large vessels from the connective tissue surrounding the fracture site and branching into the bone callus, forming a delicate network of vessels of varying caliber. Although this photomicrograph was taken after only ten days (see text) numerous anastomoses are already present.

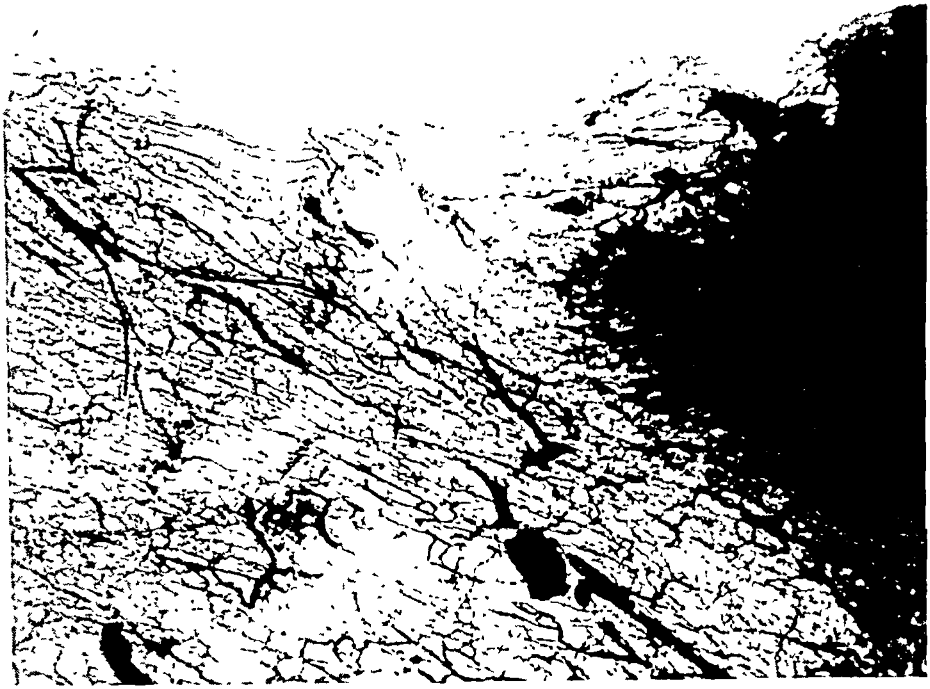


Fig. 3. Evolution of vascularization of bone callus, ten days after experimental fracture. Note the richness of vessels coming from the stumps that penetrate into the callus, branching out therein with a predominantly rectilinear course and forming anastomoses with vessels coming from the surrounding connective tissue to the fracture site.

of vascularization in bone callus was clearly revealed. During the first few days many new blood vessels were observed, running a twisted and irregular course at the site of the fracture (Fig. 2). The caliber of these vessels was variable, but they were always smaller than those observed at the site of the old callus. Most of these vessels came from the bone fragments adjacent to the fracture site, and there was evident continuity between the vessels of the normal bone and the newly formed vessels of the callus (Fig. 3). Other vessels, of larger caliber, arose from adjacent connective tissues, penetrated the callus perpendicular to the bony axis and then split into little branches, which also formed vascular loops. In this respect the vascularity of callus is quantitatively greater than that of normal bone.

After twenty days it was noted that the vascularity of the callus had undergone even further quantitative increase from the proliferation of vessels arising both from the bone and from adjacent connective tissue. But the vascular architecture during this period was completely different from that of normal bone. The blood vessels were twisted, and there was no trace of the parallel design observed in normal bone.

After thirty days the fracture site was crossed by large vessels from which vessels of smaller caliber arose and which took a course parallel to the diameter of the bone, though not yet rectilinear.

After the fortieth and seventieth days the vascular pattern closely approximated the normal. The vessels were of almost uniform caliber, followed a rectilinear course parallel to the bone axis, and are continuous with the vessels of the adjacent bony fragments. There were numerous anastomoses with the vessels arising from the surrounding soft tissues, and still more anastomoses between the individual vessels, which approximated the vascular pattern of normal bone (Fig. 4).

After one hundred and forty days the arrangement of the vascular network in the callus reproduced the normal structure. The vessels were rectilinear, and the frequency of

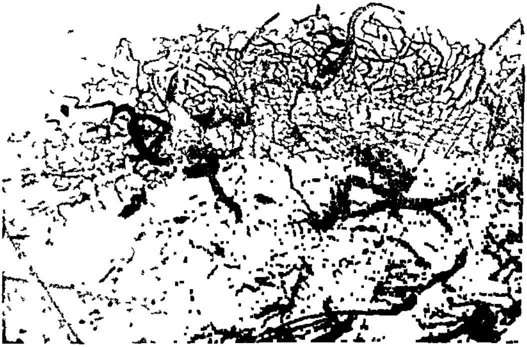


Fig 4 Evolution of vascularization of bone callus forty days after experimental fracture The bone callus is now abundantly vascularized The vessels are of large caliber and form a rich network of anastomoses They take a somewhat irregular course but show a tendency to run parallel to the bone axis

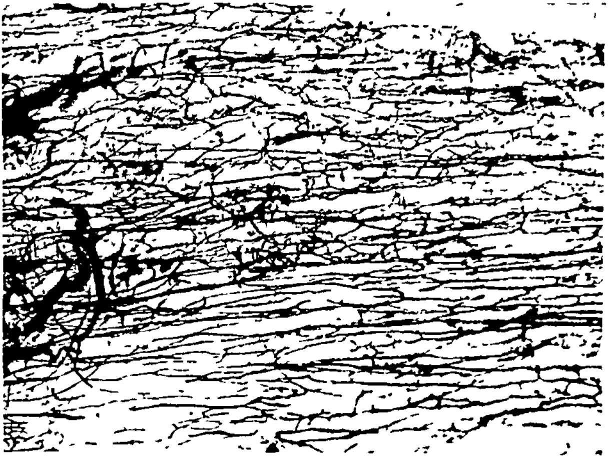
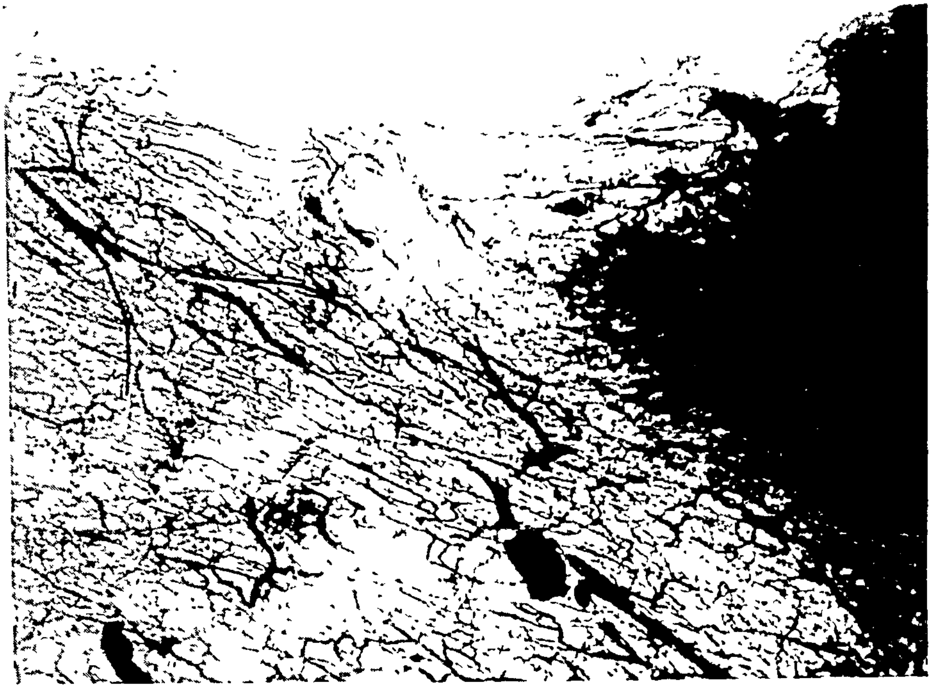


Fig 5 Vascularization of bone callus one hundred and forty days after experimental fracture The vascular network is quantitatively decreased; the most important trunks run longitudinally parallel to the bone axis The final vascular network is analogous to that of normal bone



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lo tanto contraria a la de Lubarsch y Leuche que han declarado que los vasos sanguíneos del callo se originan exclusivamente de los tejidos adyacentes al callo

Este hecho es de importancia por cuanto como ya se ha dicho los osteoblastos siguen a las proliferaciones neo vasculares Esta es la razón por que el traumatismo de las extremidades del hueso se acompaña por retardo en la formacion del callo

3 Durante la formación del callo las neo formaciones vasculares siguen una ruta paralela al eje (axis) mayor del hueso La aparicion de numerosas anastomosis entre los troncos vasculares de la region del callo completan y reproducen la vascularizacion normal del hueso

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anastomoses was similar to that seen in normal bone. This vascular pattern was predominantly continuous with the vessels of the bone fragments, but anastomoses could still be observed between these vessels and those arising from the nearby connective tissues, with a tendency toward decrease in caliber and frequency (Fig. 5).

SUMMARY

1. A few days after a fracture, the hematoma in the fracture site is rapidly replaced with vessel buds and newly formed vessels, which run a twisted course and are more numerous than the vessels seen in normal bone.

2. The newly formed vessels of the callus (in opposition to the opinion of Lubarsch and Lauche, who have stated that the vessels of the callus take origin exclusively from the adjacent connective tissue), originate equally from the vascular pattern of the bony stumps and from the pericallous soft tissue. This fact is of considerable importance because, as has been said, the osteoblasts follow the proliferating vascular buds. If, however, there is injury of the bone ends, the development of these vessels and the formation of the callus are delayed.

3. During the evolution of the callus the newly formed vessels gradually follow a longitudinal route parallel to the bone axis. With the appearance of numerous anastomoses between various vessel trunks in the callus site, normal vascularization of bone is completely reproduced.

RÉSUMÉ

1. Peu de jours après une fracture, l'endroit où se produit l'hématome dans la fracture est rapidement comblé par des bourgeons vasculaires et des vaisseaux de néo-formation qui s'accroissent dans un parcours tourmenté et sont plus nombreux que les vaisseaux rencontrés dans un os normal.

2. Les vaisseaux de néo-formation du cal (à l'encontre de l'opinion de Lubarsch et Lauche, qui ont établi que les vaisseaux du cal prennent leur origine exclusivement dans le tissu conjonctif adjacent), proviennent également du lacis vasculaire des moignons et des tissus mous entourant le cal. Ce fait est d'une importance considérable parce que, comme on l'a dit, les ostéoblastes suivent la prolifération des bourgeons vasculaires. Si, cependant, les extrémités de l'os sont traumatisées, le développement de ces vaisseaux et la formation du cal sont retardés.

3. Pendant l'évolution du cal les vaisseaux de néo-formation suivent progressivement une route longitudinale parallèle à l'axe de l'os. Montrant de nombreuses anastomoses entre les différents troncs vasculaires à l'endroit du cal, la vascularisation normale de l'os est complètement rétablie.

RIASSUNTO

1. Nei primi giorni dopo una frattura, l'ematoma fromatosi nella sede stessa della frattura viene rapidamente sostituito da gemme vascolari e da vasi neoformati, aventi un decorso tortuoso ed in numero assai maggiore che nell'osso normale.

2. I vasi neoformati nel callo derivano (a differenza di quanto hanno ammesso Lubarsch e Lauche, secondo i quali questi avrebbero esclusivamente origine dal connettivo limitrofo) in parte dal sistema vascolare dei monconi ossei, in parte dal tessuto molle pericalloso. Questo fatto assume una notevole importanza, in quanto gli osteoblasti seguono i gettoni vascolari in via di proliferazione. Ne consegue, che se la lesione interessa i monconi ossei, la proliferazione di questi vasi e—per riflesso—la formazione del callo viene ritardata.

3. Durante lo sviluppo del callo i vasi neoformati seguono gradatamente un decorso longitudinale, parallelo all'asse dell'osso. Con la comparsa di numerose anastomosi fra i tronchi vascolari nella zona del callo, una normale vascolarizzazione dell'osso viene rapidamente riprodotta.

SUMARIO

1. Pocos días después de una fractura osea, el hematoma que se ha formado es invadido rápidamente por nuevos vasos sanguíneos. Estos vasos son tortuosos y más numerosos que en el hueso normal.

2. Las neo-formaciones vasculares del callo, en la opinión del autor, se originan igualmente de los troncos vasculares hueso en la región misma de la fractura y de los tejidos blandos que envuelven al callo. (Esta opinión es por

lo tanto contraria a la de Lubarsch y Leuche, que han declarado que los vasos sanguíneos del callo se originan exclusivamente de los tejidos adyacentes al callo

Este hecho es de importancia, por cuanto, como ya se ha dicho, los osteoblastos siguen a las proliferaciones neo vasculares Esta es la razón por qué el traumatismo de las extremidades del hueso se acompaña por retardo en la formación del callo

3 Durante la formación del callo, las neo formaciones vasculares siguen una ruta paralela al eje (axis) mayor del hueso La aparición de numerosas anastomosis entre los troncos vasculares de la región del callo, completan y reproducen la vascularización normal del hueso

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The publication date of the

New Roster

of the International College of Surgeons

is approaching Those who have not sent in their new addresses or proper teaching affiliations will please do so immediately. All members of the United States Chapter should send these data to 1516 Lake Shore Drive, Chicago 10, Ill International members should write to the Secretary General, Dr Max Thorek, 850 West Irving Park, Chicago 13 Ill , U S A

Solitary Diverticulitis of the Cecum: A Simple Method of Management

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ALTHOUGH diverticula may occur anywhere along the gastrointestinal tract, from the pharyngo-esophageal junction to and including the rectum, solitary diverticulum of the cecum is rare. Such an outpouching is more frequently observed in the colon, particularly the sigmoidal portion.

In 1898, Graser first described sigmoidal diverticulitis as a form of tumor (tumor of Graser). In 1911, Chutro[1] reported a case of what he described as an anomalous appendix; however, Potier,[2] in 1912, is credited with the first report of diverticulitis of the cecum. Various isolated cases have been reported since the initial recognition of this entity. In 1940, Schnug[3] reviewed the literature, collecting 32 cases and adding his own. In 1943, Baker and Carlille[4] reviewed the English and American literature of the preceding twenty years, encountering 37 cases and adding 2 of their own. In 1945, Dussaut and Sanroma[5] related their experience in 2 cases. During the following year, Vernengo and Villafane[6] added another case. It is possible that numerous additional cases have been observed but not reported.

The predominance of diverticulitis of the cecum in the male over its incidence in the female is 2 to 1. Ochsner and Bargen[7] have estimated this predominance as 2.75 to 1 among patients in whom diverticulitis was present at the time of examination. As to the age incidence, the condition occurs usually in persons past 35, the majority being close to the fifth decade of life.

Since this condition was first described, several theories have been advanced as to its cause. Glandular or neuromuscular dysfunction, muscle weakness, increased intracolonic pressure, a potential weak spot in the intestines at the site of entrance of blood vessels, vascular stasis and the degenerative changes of senility have been held responsible. Recently, Dixon[8] has suggested the following plausible sequence of events producing diverticulitis: "First, diverticula are probably formed by contraction occurring simultaneously distal and proximal to a normal segment of bowel. The increased tension created in the normal segment by the above mechanism causes herniation of small portions of the mucosa through the wall of the bowel at areas of least resistance." However, none of these theories explains conclusively the production of diverticulosis.

Telling,[9] in 1908, classified diverticula as congenital and acquired. The congenital or true diverticulum occurs when all coats of the intestine are present; the acquired or false diverticulum, when the muscular coat is absent or very thin at a point where it is difficult to differentiate between the circular and the longitudinal fibers.

According to Schnug, the sites of cecal diverticulitis in order of frequency are as follows: (1) externolateral, (2) anterior and (3) on the ileocecal curvature. The diverticulum varies in length and not infrequently terminates in a bulbous expansion. In the case observed by Chutro it measured 14 cm. Sometimes, instead of an enlargement, the diverticulum terminates in a fibrous cord.

There are no clinical points of difference between diverticulitis of the cecum and acute appendicitis. There is pain in the right iliac fossa or over the McBurney region; the patient has a moderate fever and leukocytosis. Physical examination reveals localized deep tenderness in the right iliac fossa over McBurney's area. In many cases a tender mass is palpable. This mass may be mobile or somewhat fixed.

Preoperatively this condition is indistinguishable from acute appendicitis. A barium enema is contraindicated because of pain

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in the cecal region, although Bockus has stated that roentgen examination rarely aids in diagnosis

After the abdomen is opened the hard inflammatory mass felt at the cecum suggests the following possibilities in order of frequency malignant tumor hyperplastic tuberculosis, actinomycosis, nonspecific ulceration of the cecum and regional ileitis This localized inflammation of the cecum arising from the diverticulum on its wall may have caused perforation due to local abscess formation or occasionally, generalized peritonitis is present The appendix is usually not involved

REPORT OF CASE

Mrs M M, a well developed well nourished white housewife aged 55 and weighing 160 pounds (73 Kg) was admitted to St Elizabeth's Hospital on Jan 15, 1949, with the initial complaints of two episodes of vomiting and generalized abdominal pain which had lateralized to the right lower quadrant within the last twelve hours An inventory of symptoms by systems revealed no other gastrointestinal subjective complaints and no complaints referable to the other major body systems The history revealed no previous operations, injuries or illnesses The family history and the gynecologic history were noncontributory

The patient was cooperative but stoical She was not in acute distress Her oral temperature on admission was 100 F, and her respiration rate was 24 per minute The color and texture of the skin were normal Examination of the head eyes, ears and nose disclosed no abnormality except moderate conduction deafness in the right ear Examination of the mouth revealed edentulous jaws, the oral and pharyngeal mucosa was normal The lungs were clear to percussion and auscultation Examination of the heart disclosed a rate of 74, regular rhythm, and no murmurs cardiac percussion revealed the apex beat 11 cm to the left of the midsternal line in the fifth intercostal space The blood pressure was 146 mm of mercury systolic and 78 diastolic Abdominal examination disclosed moderate obesity, no scars, no vessels on inspection, palpation revealed tenderness and rigidity in the right lower quadrant, with rebound tenderness, a palpable mass about the size of a golf ball was felt in the right lower quadrant auscultation disclosed continuous bowel sounds Examination of the lymphatic system gave negative results The neurologic deep reflexes were normal Rectal examination disclosed tenderness on pressure toward the right iliac fossa

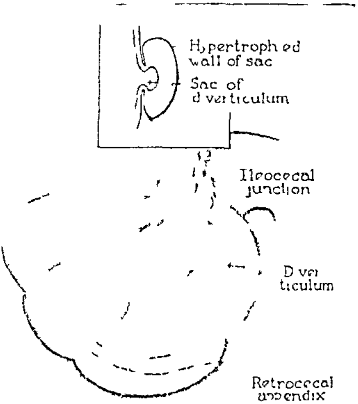

Fig 1—Solitary diverticulitis of the cecum

Laboratory examination revealed an erythrocyte count of 5,500,000, the leukocytes numbered 14,000 with 75 per cent polymorphonuclears The value for hemoglobin was 14 5 Gm per hundred cubic centimeters of blood Urinalysis for albumin, sugar, acetone and cells gave negative results

The preoperative impression was that of an acute abdominal condition (acute appendicitis) or a twisted ovarian cyst After suitable preparation the patient was laparotomized The cecum was mobilized, and a mass about the size of that palpated extra abdominally was noted on the anterior cecal wall below the ileocecal junction The mass was indurated to palpation disclosed a broad base of attachment and showed signs of acute inflammation The ileum showed no pathologic change The appendix was not inflamed but was bound down retrocecally to the posterolateral abdominal wall There were soft palpable glands at the root of the mesentery The stomach and biliary region, as well as the pelvic organs, rectum and colon were normal to palpation We decided to exteriorize the cecum to study the tumor further In the process, to enable us to deliver the cecum properly we performed an appendectomy The exteriorization was modified after a method described by Frehling[11] The peritoneum was closed with No 0 plain catgut suture up to and surrounding the tumor mass The fascia was likewise approximated with No 0 ch[illegible]t suture

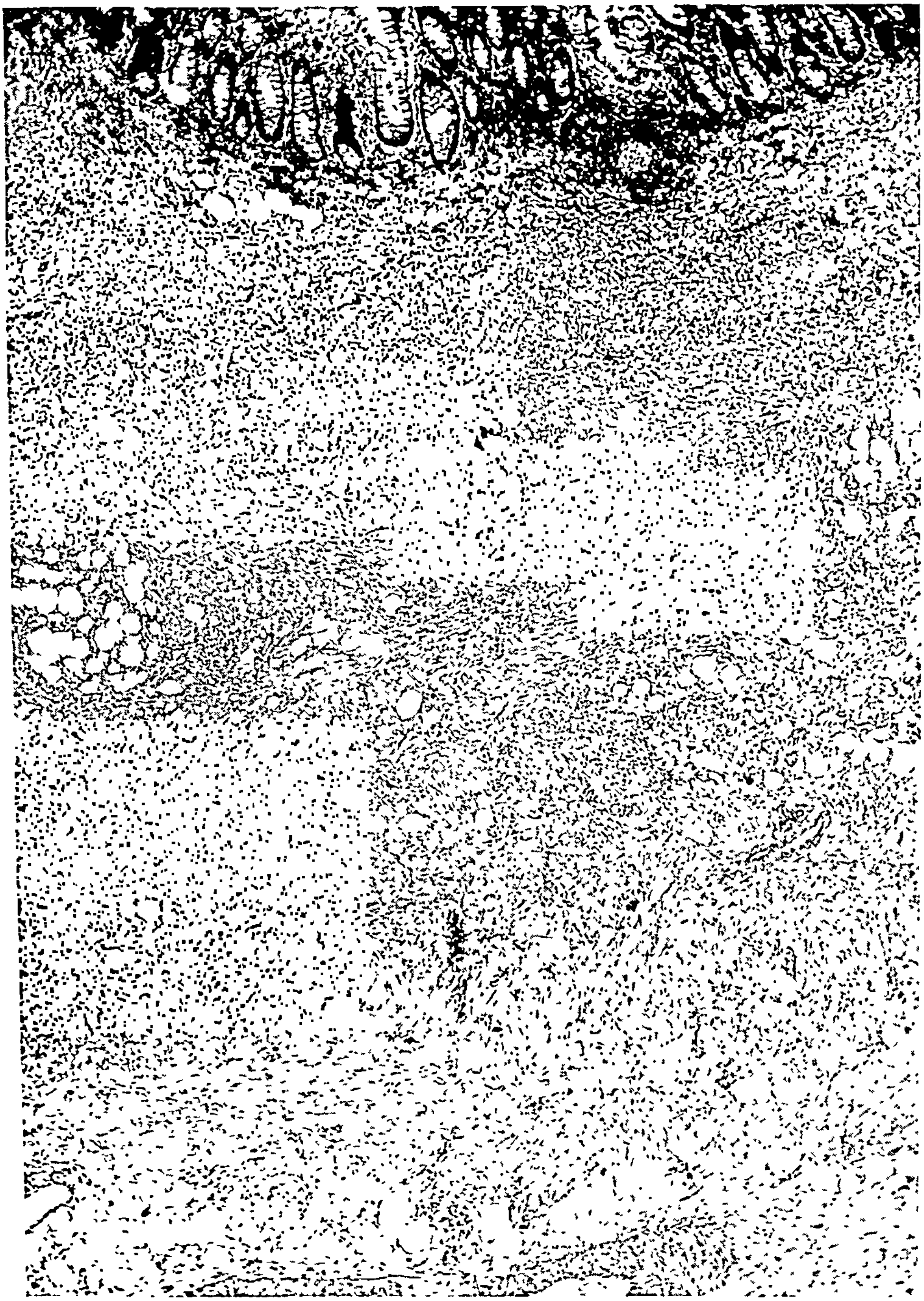

Fig. 2.—Photomicrograph showing (from top down) mucosa, lymph node, mucosa muscularis, submucosa and serosa. The lymph node shows moderate hyperplasia. Disarrangement in the mucosa muscularis is due to inflammatory exudate. In the submucosa, note the disarranged muscle fibers, oblique, circular and longitudinal, the result of irregular development and inflammatory exudate. (Irregular development of the musculature may be ascribed to the fact that peristalsis in the diverticulum is minimal as compared with similar physiologic function elsewhere in the large bowel.) The serosa exhibits swelling, again due to inflammatory exudate.

The skin and subcutaneous fatty tissue were approximated with interrupted silkworm suture above and below the intervening mass. A vaseline gauze dressing was applied over the exteriorized mass, which now protruded through the skin. The patient returned from the operating room in good condition.

On January 17, forty eight hours after the operation, the exteriorized mass was removed. With removal of the mass the remainder of the bowel was permitted to retract into the abdominal cavity. The surrounding peritoneum had sealed the base where the mass originally existed and the [illegible] defect was closed with interrupted dermal sutures. On January 24 the area of the wound showed good healing except for a small fistulous opening.

The postoperative course was uneventful except for a pulse rate of 100 on the second and third postoperative days. The patient was discharged from the hospital on the twelfth day ambulatory and in good general condition.

The biopsy specimen was described by Dr. John J. Kearns as follows: "The tumor consists of discoid semifirm mass measuring 3 cm × 0.5—1 cm. It varies from grayish tan to mottled dusky red and is moist. At about the midpoint of the tumor on the long axis, there is a soft, dark gray to white area 0.4 by 0.3 cm, which is present on only one surface. Microscopic examination reveals that the tumor mass consists of large bowel which at one point is replaced by amorphous granular debris consisting of red cells, acute inflammatory cells, edema and bowel wall. Elsewhere the mucosa, membrana propria, mucosa muscularis, submucosa and intermuscular tissue and serosa are edematous and infiltrated with acute inflammatory cells and eosinophilic leukocytes. Muscle fibers, circular and longitudinal, are markedly attenuated and disarranged."[11]

The microscopic diagnosis was solitary cecal diverticulum with acute and necrotic inflammatory changes.

COMMENT

We report this case of solitary diverticulitis of the cecum because of its rarity, because its manifestations were indistinguishable from those of acute appendicitis and because of a modified method of treatment first described by Frehling.

A review of the literature shows that the type of operation performed for diverticulum has varied according to the extent of the lesion. Some surgeons have elected to do simple resection of the diverticulum, others have chosen a more extensive procedure, such as resection of the cecum and hemicolectomy. The latter was done when the pericecal mass or induration was so great that the condition was mistaken for carcinoma or tuberculosis of the cecum.

With the diagnosis established, several types of operative procedure are advocated. These depend upon the location of the diverticulum on the cecum in respect to the ileocecal valve. If the diverticulum is on the lateral or the anterior portion of the cecum a simple resection of the diverticulum is performed almost in the same manner as resection of an acutely inflamed and suppurating appendix. If the diverticulum is situated close to the ileocecal valve, a more radical procedure such as the [illegible] Mikulicz type of exteriorization has been advocated. However, in some cases the cecum and part of the ascending colon have been resected, intestinal continuity being reestablished by means of a side to side ileocolostomy.

It is in such cases as this, in which the diverticulum is close to the ileocecal valve, that our modification of Frehling's procedure is indicated. Here the exteriorization is performed by using the cecum with its pericecal mass. The peritoneum and fascia are closed above and below the exteriorized bowel, the skin is left open at the center of the wound. After forty eight hours, with the peritoneum sealed around the base of the mass, the diverticulum is excised and the edges of the skin are approximated with interrupted dermal sutures. This obviates a major resection, and the resulting fistula usually closes within a few weeks. However, if the diverticulum has perforated or is undergoing abscess formation, this procedure cannot be followed.

SUMMARY

1. Solitary diverticulitis of the cecum is rare.
2. This condition simulates acute appendicitis or cecal tumor.
3. Treatment is always surgical, extirpation of the diverticulum being the method of choice.
4. A modified surgical procedure after Frehling (exteriorization of the cecum with its pericecal mass) is recommended as simpler method, espec[illegible] cons[illegible]

whose practice this particular lesion has been encountered rarely, if ever.

SUMARIO

1. La diverticulitis solitaria del intestino ciego es rara.
2. Cuando se presenta simula la apendicitis aguda o un tumor cecal.
3. El tratamiento es siempre quirúrgico. La extirpación del divertículo es el método de selección.
4. Se recomienda en ciertos casos la modificación del procedimiento quirúrgico de Frehling, que consiste en la exteriorización del intestino ciego, especialmente cuando el cirujano no está familiarizado con esta condición patológica.

RÉSUMÉ

1. La diverticulite isolée du coecum est rare.
2. Des tels cas peuvent faire croire à une crise d'appendicite aigue ou à une tumeur du coecum.
3. Le traitement est toujours chirurgical, l'ablation du diverticule restant la méthode de choix.
4. Un procédé chirurgical modifié du à Frehling (l'extériorization du coecum et de masse péricoecale) est recommandé comme étant une méthode plus simple, particulièrement pour les chirurgiens qui ont eu rarement l'occasion de rencontrer ce genre de cas dans leur pratique, si jamais ils l'ont eu.

RIASSUNTO

1—La diverticolite solitaria del cieco e' rara.

2—Quest'affezione ricopia la sintomatologia dell'appendicite acuta o di un tumore del cieco.

3—La cura e' sempre chirurgica: l'asportazione del diverticolo e' il metodo di elezione.

4—L'esteriorizzazione del cieco con la massa pericecale (metodo proposto da Frehling) puo' essere talvolta raccomandato, per la maggiore semplicita', quando la diverticolite si presenti a chirurghi non aventi precedente esperienza in materia.

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Adenocarcinoma and Carcinoid of the Appendix

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THE value of examining microscopically all tissue surgically removed, whether it is a hemorrhoidal tag or an innocent looking appendix, was again called to our attention when a pathologic report of a surgically removed appendix came back with a microscopic diagnosis of adenocarcinoma. This interesting but surprising condition is so rare that it is not impossible for an actively practicing surgeon to go through his entire surgical career without encountering it, to say nothing of diagnosing it preoperatively. In reporting this case, we think it worth while to present and discuss adenocarcinoma in relation to a case of carcinoid of the appendix also observed in this clinic.

In reviewing the medical literature, one finds some confusion with regard to these two conditions. Many authors have grouped adenocarcinoma and carcinoid together as malignant growths. By most writers Beger is given credit for reporting the first unquestionable case of primary carcinoma of the appendix, in 1882. Twenty one years later Moschkowitz,[1] in a careful search of the literature, found only 18 cases of carcinoma of the appendix. From then on it was assumed that since the appendix was being subjected more and more often to microscopic examination, the resultant increase in the incidence of carcinoma was to be expected. In 1926, Van Alstine[2] reported 2 cases and on reviewing the literature found an additional 300. Three years later Salinger reported 34 cases of primary carcinoma of the appendix collected from the Post Graduate Hospital in New York. More recently, Young and Wyman[3], surveying the literature from 1932 to 1942, found many cases of carcinoma of the appendix. On careful scrutiny, however, they noted that many authors had grouped carcinoids and adenocarcinomas together without making any distinction between them. Consequently, they were able to accept only 4 cases reported in the ten year period as cases of true adenocarcinoma. The reason for this apparent confusion is the fact that in the earlier literature all carcinoids were described as malignant growths. Ellwood[4] credits Lubarsch with first describing carcinoid as an interesting but separate pathologic entity in 1888. It was not until 1907, however, that Oberndorfer of Germany discussed this tumor in detail, pointed out facts differentiating it from true carcinoma, and coined the name carcinoid. He went on to say that carcinoids never metastasize and that recurrences after operation, which seldom take place, are only local. Strange to say, the same tumor, if it arises from the stomach or large bowel, will metastasize. Ewing[5] also, in his *Textbook of Pathology,* stated that carcinoid tumors are practically always benign. Foot,[6] in his *Textbook of Pathology in Surgery,* stated that carcinoids arising in the appendix are almost invariably noncancerous. Furthermore, these benign tumors have often been found at routine autopsy in the appendixes of patients who died of some unrelated condition. It thus becomes obvious that adenocarcinomas and carcinoids must be properly recognized and differentiated if proper surgical treatment is to be instituted.

ETIOLOGY

The cause of both adenocarcinomas and carcinoids is unknown. The appendix, being a vestigial organ, frequently infected and with a poor blood supply, provides ample ground for discussion. Masson, however, stated his theory of the origin of carcinoids by saying "Carcinoids result from proliferation of intranervous argentaffin cells of neurocrine type."

INCIDENCE

The true incidence of adenocarcinoma of the appendix, when the various reports are scrutinized, is exceedingly low. The case here described is the first to be encountered in this clinic since its organization in 1911, whereas carcinoids have been frequently seen. Selinger[8] found 34 cancerous lesions of the appendix

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[illegible] M.B.

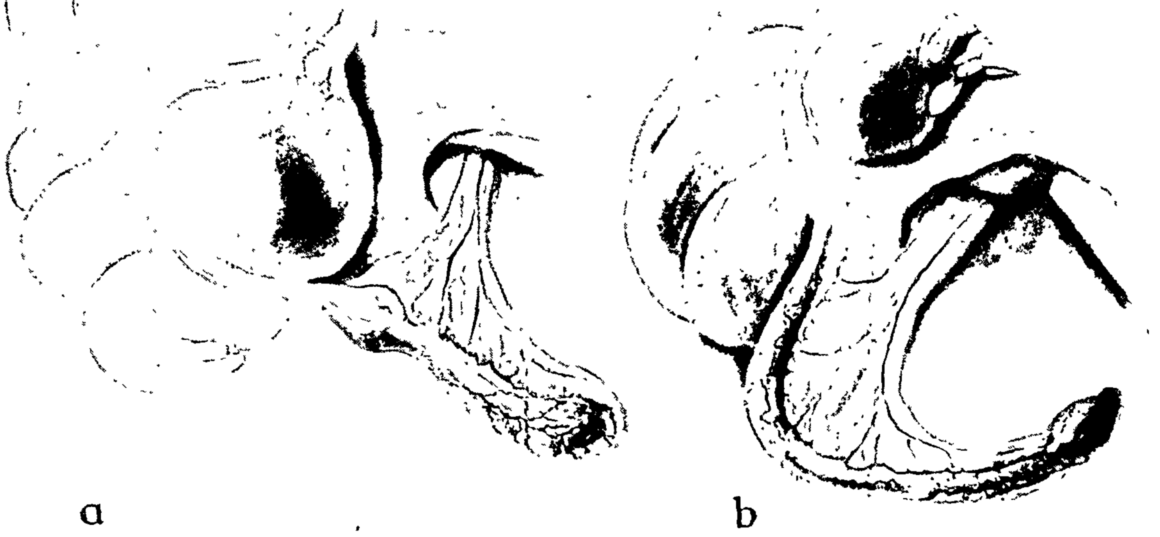

Fig. 1. Comparison of (*a*) gross appearance and location of adenocarcinoma at base of appendix as seen in the operating room in Case 1 with (*b*) gross appearance and typical location of carcinoid at tip of appendix as observed at operation in Case 2.

among 45,302 pathologic specimens of all types. This constitutes 0.075 per cent of all the surgical specimens, or 0.35 per cent of all the appendixes removed. The extensive monograph of Simon[9] on appendiceal carcinoma and carcinoid shows already clearer distinction between these two forms of disease. Out of 325 appendiceal tumors mentioned, he considered 260 cases as carcinoids. In general, carcinoids are at least ten times more common than adenocarcinomas of the appendix. In turn, according to Jones,[10] carcinoids are five times more common in the appendix than in the small bowel. Bieren[11] reported 242 cases of adenocarcinoma of the large bowel to 2 cases of adenocarcinoma of the appendix between the years 1922 and 1939. Of the 2 patients with adenocarcinoma, 1 died of peritonitis in three days; the other survived operation to die in two years of generalized metastases. Schuldt[12] reported a total of 3,692 appendixes removed and studied at St. Joseph's Hospital in Minnesota. He reported that adenocarcinoma of the appendix had an incidence of 0.027 per cent as compared to an incidence of 0.216 per cent for carcinoid of the appendix. Thus, in general, adenocarcinomas are seldom seen and carcinoids are more frequently encountered.

AGE AND SEX

Like malignant growths elsewhere in the gastrointestinal tract, adenocarcinomas occur most commonly in persons of advanced age, whereas the relatively benign carcinoid occurs mainly in the second or third decade of life. However, both types of growth have been seen in persons ranging in age from 5 to 80. Jones[10] found carcinoids most frequently among adults under 35. Porter and Whelan likewise observed that carcinoids of the appendix are encountered most frequently among persons in the third decade, and seldom in persons beyond it.

With regard to sex, it is common knowledge that both lesions occur more commonly in the female than in the male. Boyer,[13] in his report of primary carcinoma of the appendix, found 60 to 70 per cent occurring in females. Selinger[8] reported that, in 34 cases of primary carcinoma of the appendix, 28 or 82.4 per cent of the patients were female. Concerning this marked discrepancy he observed: "The female abdomen is subject to more surgery than the male abdomen, which in turn accounts for more routine appendectomies. With a larger number of female appendices to examine, it is logical that the greater number of carcinomas should be reported as occurring [illegible] that sex" This, too, may explain other [illegible] reports of carcinoids as occurring [illegible] frequently in the appendix

LOCATION, GROSS AND MICROSCOPIC

The gross appearance of the tumor [illegible] location in the appendix is an aid [illegible] tiating between adenocarcinoma and [illegible] Montgomery and Johnson[14] stated that [illegible] carcinoma of the appendix is always [illegible] in the proximal half of the organ [illegible] In contrast, 75 per cent of carcinoids [illegible] in the distal fourth or in the tip of the appendix (Fig 1b) Forty six of 50 [illegible] tumors reviewed by Masson were situated [illegible] the distal end of the appendix No explanation [illegible] has ever been given for this rather consistent finding Perhaps more argentaffin cells are present at the tip of the appendix

Uihlein and McDonald [15] in a recent article remarked "On gross examination the lesions may be either polypoid or ulcerative just as are carcinomas of the large bowel Because of their frequent location in the base of the appendix, obstruction to the appendiceal lumen usually results early in the course of the disease As a consequence, acute appendicitis —usually with perforation—is a common occurrence This results in early operative intervention, with removal of the diseased appendix including the carcinoma It follows naturally that the prognosis is better than it is in carcinoma of the colon, because the lesions are smaller when they are removed Histologically, this carcinoma may be differentiated producing well formed glands On the other hand, the carcinoma may be quite undifferentiated and produce signet ring cells Usually variable amounts of mucus are produced by the neoplastic cells" These authors went on to say that extra care is needed in the excision of this type of carcinoma because it frequently involves the base of the appendix occasionally extending into the cecum They pointed out also that mucus production by the carcinomatous cells of the appendix is apparently significant, although not observed in all true carcinomas of the appendix differentiating them from carcinoids On sectioning the adenocarcinoma it will be found whitish to grayish, whereas a carcinoid has a typical yellowish hue [illegible] a carcinoid is obviously different [illegible] seen by comparing the two [illegible] graphs here presented (Figs [illegible] and [illegible])

DIAGNOSIS

[illegible] the preoperative diagnosis is [illegible] There are no signs or symptoms [illegible] even the possibility of either an [illegible] or a carcinoid Although the [illegible] may be suggestive of either [illegible] a benign growth microscopic [illegible] necessary for accurate diagnosis

TREATMENT

It should be obvious by now that, from a surgeon's standpoint it is important to differentiate as soon as possible between a benign and a malignant growth in the appendix If it is the latter, extensive radical intervention is indicated Simple appendectomy is sufficient for a benign carcinoid

REPORT OF CASES

H T a white man aged 57, was admitted to the clinic on Aug 11, 1947, with a history and symptoms indicative of acute appendicitis He had an oral temperature of 99 2 F The leukocyte count was 11,400 per cubic millimeter of blood, with 63 percent polymorphonuclears 1 percent basophils, 5 percent eosinophils and 31 per cent lymphocytes Urinalysis gave negative results Operation was performed on the same day Through a McBurney incision the appendix was located It was acutely inflamed and swollen and was attached by adhesions to the lateral abdominal wall At the base of the appendix there was a small, hard swelling (Fig 1b), approximately 1 cm in diameter, which felt like an ordinary fecolith The portion of the appendix distal to this tumor showed all the signs of obstructive appendicitis Some inflammation was also noted in the cecum and the tumor seemed to taper off into the base of the appendix A routine appendectomy was performed The patient was returned to the ward in excellent condition

On readmission a right colectomy, with an end to side anastomosis of the ileum to the proximal third of the transverse colon, was performed The patient tolerated this second procedure well, recovered uneventfully and was sent home in two weeks He was seen recently in the follow up clinic, four months after the operation, with no complaints and no evidence of metastasis Fortunate the resected right colon [illegible] evidence [illegible] metastases is reported b [illegible]

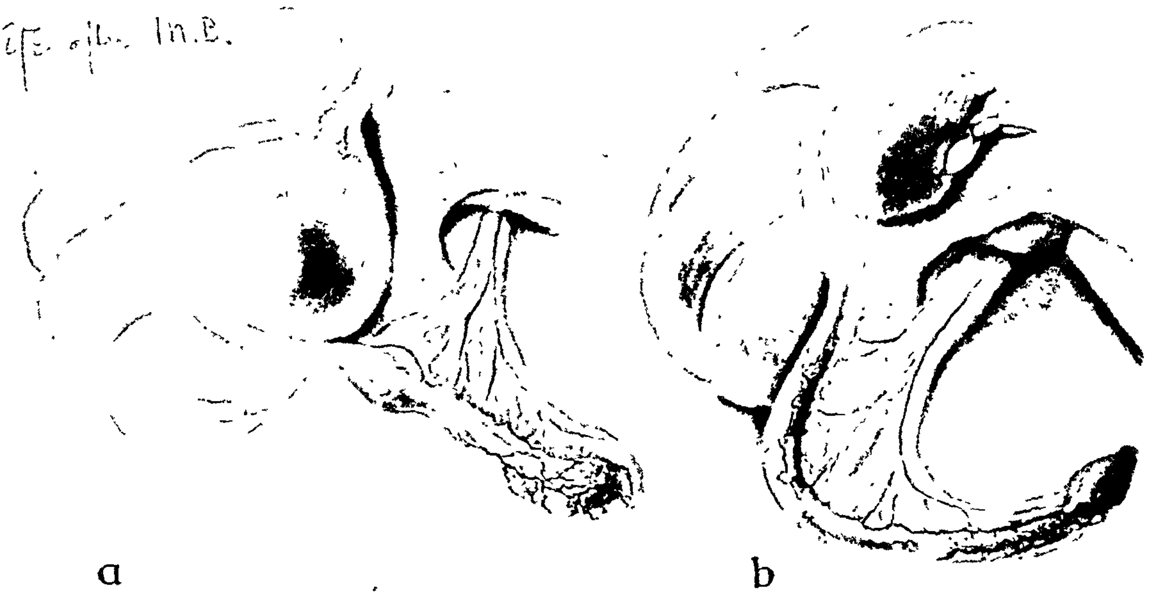

Fig. 1. Comparison of (*a*) gross appearance and location of adenocarcinoma at base of appendix as seen in the operating room in Case 1 with (*b*) gross appearance and typical location of carcinoid at tip of appendix as observed at operation in Case 2.

among 45,302 pathologic specimens of all types. This constitutes 0.075 per cent of all the surgical specimens, or 0.35 per cent of all the appendixes removed. The extensive monograph of Simon[9] on appendiceal carcinoma and carcinoid shows already clearer distinction between these two forms of disease. Out of 325 appendiceal tumors mentioned, he considered 260 cases as carcinoids. In general, carcinoids are at least ten times more common than adenocarcinomas of the appendix. In turn, according to Jones,[10] carcinoids are five times more common in the appendix than in the small bowel. Bieren[11] reported 242 cases of adenocarcinoma of the large bowel to 2 cases of adenocarcinoma of the appendix between the years 1922 and 1939. Of the 2 patients with adenocarcinoma, 1 died of peritonitis in three days; the other survived operation to die in two years of generalized metastases. Schuldt[12] reported a total of 3,692 appendixes removed and studied at St. Joseph's Hospital in Minnesota. He reported that adenocarcinoma of the appendix had an incidence of 0.027 per cent as compared to an incidence of 0.216 per cent for carcinoid of the appendix. Thus, in general, adenocarcinomas are seldom seen and carcinoids are more frequently encountered.

AGE AND SEX

Like malignant growths elsewhere in the gastrointestinal tract, adenocarcinomas occur most commonly in persons of advanced age, whereas the relatively benign carcinoid occurs mainly in the second or third decade of life. However, both types of growth have been seen in persons ranging in age from 5 to 80. Jones[10] found carcinoids most frequently among adults under 35. Porter and Whelan likewise observed that carcinoids of the appendix are encountered most frequently among persons in the third decade, and seldom in persons beyond it.

With regard to sex, it is common knowledge that both lesions occur more commonly in the female than in the male. Boyer,[13] in his report of primary carcinoma of the appendix, found 60 to 70 per cent occurring in females. Selinger[8] reported that, in 34 cases of primary carcinoma of the appendix, 28 or 82.4 per cent of the patients were female. Concerning this marked discrepancy he observed: "The female abdomen is subject to more surgery than the male abdomen, which in turn accounts for more routine appendectomies. With a larger number of female appendices to examine, it is logical that the greater number of carci-

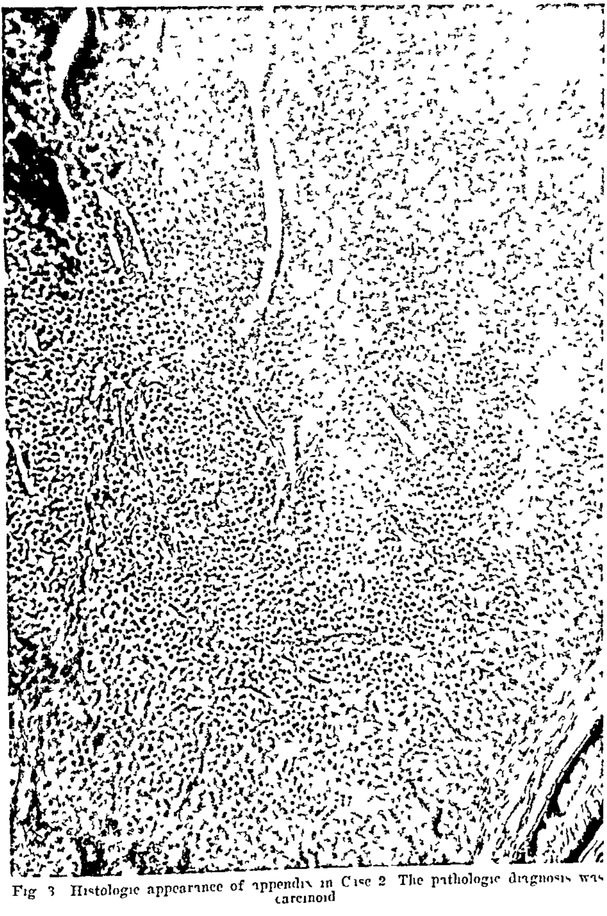

Fig 3 Histologic appearance of appendix in Case 2 The pathologic diagnosis was carcinoid

blood and lymph vessels could not be demonstrated The *pathologic diagnosis* was adenocarcinoma of the appendix

Case 2 D N, a white girl aged 17, was first seen in this clinic on Feb 2, 1947, with a typical history and symptoms of acute appendicitis of three days' duration She had an oral temperature of 99 F The leukocyte count was 10,000 per cubic millimeter of blood with 65 percent polymorphonuclears, 9 per cent eosinophils, 1 per cent basophils, 5 per cent monocytes and 20 per cent lymphocytes She was taken to the operating room Through a others have proved that downward extension through the lymphatics is rather infrequent. Little attention has been given to McVay's[9] report in 1922 on the involvement of lymph nodes in 100 cases of carcinoma of the rectum. Although 47 of the patients had metastases to lymph nodes, in only 1 instance was a node involved below the lower margin of the lesion, and this was at a distance of 1 cm. Since then, other reports on node involvement below the lower margin of the lesion have been made by Wood and Wilkie[10] in 1933; Westhuer[11] in 1934; Gabriel, Decker and Bussey[12] in 1935; Gilchrist and David[13] in 1938; Coller, Kay and McIntyre[14] in 1940; Grinnell[15] in 1942, and Glover and Waugh[16] in 1944—a total of 607 cases, and in only 5 were there metastatic nodes more than 2 cm. below the lower margin of the tumor—an incidence of 0.8 per cent (Table 1). This low figure should receive consideration. In all resections for gastrointestinal carcinoma, one elects to transect at least 1 inch (2.5 cm.) below the lower margin of the lesion, and probably most surgeons attempt to transect 2 inches (5 cm.) or more below the palpable tumor margin. If one transected the bowel at least 2.5 cm. below the lower margin of the tumor in all cases of rectal and sigmoidal carcinoma and continued to be just as radical in removing tissues in the zones of upward and lateral spread, additional recurrence on the basis of this technic should be less that 1 per cent. If the tumor recurs locally, one can resort to radical abdominoperineal excision. In fact, one is more apt to pick up early local recurrences when the continuity of the lower part of the bowel is intact than when the entire area is filled with the scar tissue that forms after a radical abdominoperineal excision. Before the foregoing remarks can be considered conclusive, however, a few more years of experience and follow-up by a considerable number of surgeons will be necessary, as conclusions drawn from apparently sound anatomic, physiologic and pathologic data are sometimes proved by actual experience to be wrong.

In low anastomoses (at or below the peritoneal reflection in the pelvis) I use the open technic.[17] Elsewhere in the colon I prefer to do a closed anastomosis over the Rankin clamp. In my experience with low anastomoses the closed type has many more disadvantages than advantages, and when it is unsuccessful it is a more troublesome procedure. Also, one is apt to be less radical in removing areas of potential spread. The disadvantage of the open anastomosis is the possible escape of malignant cells that may be present in the intestinal contents or in the mucus. In operations on the breast, we are very conscious of implants in the operative area and great care is taken to

TABLE 1.—Carcinoma of rectum and rectosigmoid: Data in 8 series of cases

Author	Year	Cases Studied	With Nodes 1 to 2 cm. below lesion	With Nodes 2 cm. or more below lesion
McVay	1922	100	1	0
Wood & Wilkie	1933	100	0	0
Westhuer	1934	74	1	0
Gabriel, Dukes & Bussey	1935	100	2	0
Gilchrist & David	1938	25	0	2
Coller, Kay & McIntyre	1940	33	1	0
Grinnell	1942	75	1	0
Glover & Waugh	1944	100	6	3
Total cases		607	12	5
Percentage			2.3	0.82

*By permission of the American Journal of Surgery.

prevent this complication. The viability of cancer cells is more marked than is generally appreciated. Unfortunately, depriving these cells of an intact blood supply or a secondary infection will not destroy them, as some have believed in the past. Therefore, in most modern procedures, extreme care is taken to prevent this complication.

In selecting patients for rectosigmoidectomy with anastomosis, one must not choose those in whom immediate mortality or later recurrence would seem, from present knowledge, to carry a higher incidence than with abdominoperineal excision. The operation is a little more difficult, potentially, at least, it carries a slightly higher mortality. One should hesitate to attempt an anastomosis in a very obese or heavy set person, for whom the abdominoperineal excision is the better choice. For the poor risk patient, as judged by his general condition, abdominoperineal excision is less hazardous, again, colostomy followed by posterior excision or a radical abdominoperineal excision in two stages may be preferable. In some instances simple colostomy, electrocoagulation or radium treatment may be indicated.

It is always desirable to avoid a permanent colostomy. When feasible on the basis of present knowledge and experience in pathologic anatomy, one of the three following procedures is recommended[1] (1) abdominal dissection with abdominal resection and anastomosis, (2) abdominal dissection with posterior resection and anastomosis and (3) posterior dissection and posterior resection and anastomosis. My experience with the pull through operation advocated by Hochenegg[5] and modified by Babcock[18] and Bacon[19] has not only been limited but has been unsatisfactory in that sphincter control has not been adequate. Possibly more experience with this technic might change my opinion, but at present I prefer some type of anastomosis.

Of the three anastomotic procedures just mentioned, abdominal dissection with abdominal resection and anastomosis seems indicated for lesions of the rectosigmoid or the rectum when the lower margin of the tumor is at least 3 inches (7.5 cm) from the external anal margin.

The second method—abdominal dissection with posterior resection and anastomosis—is recommended when the lower margin of the tumor is at or below the 3 inch (7.5 cm) level but above the 1½ inch (4 cm) level. Abdominal dissection assures radical removal of the upward zone of spread and the posterior attack permits removal of the lateral lymphatic spread into the levator fascia and muscle or any direct extension into these structures. One does not remove portions of this muscle and fascia when the procedure is accomplished entirely from within the abdomen.

The third procedure—posterior dissection with posterior resection and anastomosis which is really a slightly modified Kraske operation employing modern technics—is not adequate for carcinoma of the rectum. However, it should be recommended occasionally as reducing danger for the aged, for poor risk patients and for patients in other special circumstances. It is recommended only for lesions below the rectosigmoid.

A few remarks on technic are indicated because of the changes brought about by experience. For several reasons I am convinced that a closed type of anastomosis is not satisfactory for lesions of the rectosigmoid and rectum. First, one is apt to be too conservative in transecting the rectum below the lesion in order to apply the clamps satisfactorily. Again, many pelvises are too narrow or the lesion too low to permit one to carry out the closed technic adequately, if the attempt is made and the technic fails, the procedure becomes extremely awkward. In the open method of anastomosis the escape of infectious material is kept at a minimum, and with the use of antibiotics, infection has not been a major problem. I am more concerned about the carcinomatous implants that may follow any such operation, either as droppings from the surface of the tumor during manipulation or as leakage of intestinal contents. The principle of the Papanicolaou test may be applied here, and it should make all surgeons more alert to the possibility of implants when loose carcinoma cells are deposited during operation for cancer.

To overcome leakage, either gross or minimal, I insert a rectal tube into the rectum just before the operation and remove all rectal contents by suction. Special clamps have been devised to minimize the escape of rectal contents during transection when the procedure is accomplished entirely from within the abdomen.[20] The general principle is to place two short-nosed clamps about 5 cm. below the lower margin of the tumor, leaving a small space between the ends of the clamps. Then a clamp is placed just above them so as to block the upper segment completely. The rectum is opened first between the ends of the two lower clamps; a metal suction tube is immediately inserted through this opening into the lower segment, and all material is removed. The rectum is then completely transected between the upper and the lower clamp. In my opinion, this keeps escape of rectal contents at a minimum. The clamps on the lower segment are then replaced by long stay sutures.

In the anastomosis, the upper segment of bowel is first approximated onto the lower segment of five posterior catgut sutures, with the knots on the mucosal side to insure good inversion. A single anterior catgut suture is then inserted with the knot on the mucosal side. The anastomosis is completed with a layer of interrupted figure-of-eight silk sutures. Experience has taught me not to be too zealous in cleaning the fat tabs off the ends that are to be anastomosed. It is constantly kept in mind that a crushing clamp has previously been placed on the lower segment and the sutures are placed at least ¼ inch (0.64 cm.) from the transected margin. When the anastomosis is accomplished through a posterior or sacrococcygeal incision as in the second and third methods, a routine opening procedure is used, clamps being used to prevent spilling.

I prefer to decompress the colon by means of a tube cecostomy, using a large mushroom catheter. No fecal drainage occurs after removal of the catheter if the mucosa of the cecum has been properly inverted around the tube and the cecum fixed to the parietal peritoneum. A cecostomy appears to offer better decompression than nasogastric or nasointestinal suction, and certainly it is more comfortable for the patient. Some surgeons prefer a proximal colostomy, but I do not think this necessary, and it does require another operative procedure for closure.

In all low anastomoses in which the peritoneum of the pelvic floor is closed above the suture line, I establish drainage of the presacral space by placing a drain in the hollow of the sacrum and delivering it posteriorly through a small incision along the coccyx. Care is taken not to place the drain along the line of anastomosis. When the pelvic peritoneum is closed below the suture line, I do not establish drainage.

Of a series of 40 consecutive patients (Table 2) operated upon by myself, 34, or 85 per cent of the tumors were considered operable. In

TABLE 2.—Carcinoma of rectum and rectosigmoid: Analysis of 40 consecutive cases

	Cases	Operation*	Resection	Anastomosis†	Abdominoperineal Resection†
Number	40	34	30	25	5
Percent		85	75	83.4	16.6

*Percent of total.
†Percent of resectable lesions.

Mortality rate in 30 cases of resection

Total Deaths	Deaths with anastomosis	Deaths with Abdominoperineal Resection
2 (6.6%)	2 (8%)	0

30 (75 per cent) the tumors were resectable. Of the 30 patients resected, anastomosis with preservation of the sphincter mechanism was accomplished in 25 instances (83.4 per cent) and abdominoperineal resection was done in 5 (16.6 per cent). There were 2 deaths, a total mortality of 6.6 per cent following resection. The 2 patients who died had undergone rectosigmoidectomy and anastomosis (mortality 8 percent). Sphincter control in the 25 patients with preservation of the sphincter mechanism was satisfactory in all cases except 2. One of the 2 patients, a woman 82 years old, had minimal leakage, but the sphincter had practically no tone. However, it appeared that sphincteric power was gradually improving. About three months after the operation, a small rectovaginal fistula developed. This, of course, made it impossible to determine the status of sphincter control. More recently, in this patient, an abdominal mass consistent with carcinoma has developed. The other patient, a man 68 years of age, has a rather atonic sphincter; leakage occurs if there is a tendency toward loose stools. In 2 other patients the sphincter is rather atonic to digital examination but control is satisfactory.

Among the male patients in whom the sphincter had been preserved and where frank discussion had revealed some sexual activity prior to operation, 2 volunteered some satisfactory inclination. It is well known that abdominoperineal resection practically always destroys sexual activity, regardless of the patient's age. Detailed interrogation of more patients will be necessary before this factor can be evaluated, but apparently, among patients who have a rectosigmoidectomy with anastomosis, there is less likelihood of complete destruction of sexual function.

After analyzing the anatomic lymphatics picture and the pathologic studies of removed specimens, one cannot help but feel that the figures on the percentage of cures may be quite similar. Certainly the evidence is sufficient to warrant further effort and experience in preserving the sphincter mechanism. One cannot justifiably compare the figures on morbidity, mortality and curability after operations for carcinoma of the rectum and rectosigmoid done twenty-five years ago (or more) with those done in the last decade. Not only have we made advances in technic and in preoperative and postoperative care but antibiotics have contributed much to surgery in general and knowledge of blood chemistry has advanced; also there is a much clearer understanding of the pathologic anatomic picture of carcinoma of this section of the gastrointestinal tract. Even though the percentage of cures should range a little higher with operations that destroy all semblance of a sphincter mechanism and require the patient to carry an abdominal colostomy, it is my opinion that the patient should have some choice in the matter and be permitted to take the chance if he wishes. Again, after operations for restoring rectal continuity and preserving the sphincter mechanism, one has an opportunity to check the area for local recurrence; if it does take place, radical abdominoperineal excision can still be done. I have recently had such an experience. The patient was subjected to a radical abdominoperineal resection twenty-two months after a rectosigmoidectomy with anastomosis. There was no evidence of metastasis to the liver or of pelvic lymph node involvement. There was no evidence of local recurrence at the site of anastomosis 3 inches (7.6 cm.) above the sphincter level, but there was a small mass of rectal carcinoma about 1 inch (2.5 cm.) below the line of anastomosis. This area was covered by normal mucosa and was thought to be a neoplastic implant from the primary tumor. With radical abdominoperineal excision one has no opportunity for direct examination of the rather large space previously occupied by the rectum, and implants or recurrent carcinomatous masses do not make themselves known until the mass is very large, until invasion of other structures has taken place or until metastases have developed and the condition is hopeless.

SUMMARY

Proper evaluation and comparison of the relative curability of radical rectosigmoidectomy with anastomosis and preservation of the sphincter mechanism and that of radical abdominoperineal resection must be postponed for a few years. Continued investigation and experience are warranted, since the limited reports at this time are favorable.

SOMMAIRE

On ne peut raisonnablement faire une évaluation et une comparaison entre les resultats définitifs donnés par la rectosigmoïdectomie radicale avec anastomose et conservation des éléments du sphinctér et ceux donnés par la résection radicale abdominopérinéale. Il est nécéssaire d'attendre encore plusieurs années, avant de se prononcer, attendu que les recherches continuent et que les rapports qui sont à notre disposition sont encore limités.

RIASSUNTO

Ritiene che la scelta fra rettosigmoidectomia con anastomosi e conservata funzione dello sfintere, e resezione radicale addomino-perineale non sia ancora possibile, perche' le statistiche sono troppo limitate e di data recente. Solo ulteriori indagini ed una piu' larga esperienza clinica potranno decidere quale delle due operazioni sia preferibile.

SUMARIO

El juicio final sobre el valor de la rectosigmoidectomia radical con preservacion del mecanismo funcional del esfincter, en comparacion con la reseccion radical abdomino-perineal, debe de posponerce por unos anos mas. Aun se debende continuar las investigaciones con estos procedimientos, por cuando las estadisticas del presente son limitadas y favorables a los dos.

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Modified Treatment of Appendical Stump

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SINCE the first appendectomy was performed by Kronlein[1] in 1884 and later deliberately and successfully by Morton of Philadelphia in 1887, the treatment of the appendical stump has always been an important problem. As a matter of fact many technics, modifications and remodifications have been devised since then but even now there seems to be no procedure that appeals equally to all discriminating surgeons. It may be said without exaggeration that there are as many technics of treating the stump as there are surgeons performing appendectomies. It is the purpose of this paper to review briefly the most common technics in use today, to point out their advantages and disadvantages and to describe fully a technic which, although a modification of the nonligation and inversion method previously performed by Ochsner and Lilly and later by Stratte, is in our opinion the most rational and the most advantageous and is attended by the fewest postoperative complications.

1. *Simple Ligation, or "Tie and Drop" Method.* This is the simplest of all the technics now employed and consists, as its name indicates, of ligating the appendix at its base, cutting off the organ and dropping the stump back into the peritoneal cavity with or without tying the mesoappendix over it. Although very easy and simple, this procedure is surgically unsound and particularly dangerous because there is a possibility that the stump may blow out at any time and produce fatal peritonitis, a complication observed by Ochsner and Murray[2] several times, and also by Hilarowicz.[3] Previous studies of the laws of adhesion formation have definitely established the fact that adhesions are almost certain to occur about any unperitonealized surface within the peritoneal cavity. Studies of appendectomies by Goode and Kregel[4] on experimental animals treated in this manner yielded the following results: 1. No healing took place until the slough beyond the tie was removed. 2. Examination of the cecum five days after the stump had been ligated, carbolized and dropped in the abdomen revealed a mass of adhesions joining the ileum or the omentum over the stump. When these were carefully separated they revealed either an opening into the cecum or an insecurely healed stump closed by a very thin layer resembling a spider web through which, on gentle squeezing of the cecum, fecal material escaped. 3. It was noted that there is always a possibility that appendicitis may recur when the stump has been treated in this manner, because too long a stump has been left. Torek[5] pointed out the danger of postoperative adhesions and intestinal obstructions, citing two cases to prove his point. One of the patients died, the other was operated on and the observations were the same in two cases. Ochsner and Lilly,[6] after an extensive and exhaustive study of the literature on the pros and cons of ligation and drop technic summarized the objectionable features of this method as follows:

1. Closure of the bowel is likely to be inadequate, because serosa is not brought into apposition with serosa. 2. The ligated stump, which often is infected, lies free in the peritoneal cavity and can be a source of contamination. 3. Adhesions are likely to occur around the ligated stump.

Lilienthal reported postmortem observations on three patients who died of peritonitis from three to six days after simple ligation appendectomy. Adhesions were observed in almost every part of the abdominal cavity.

Ochsner and Lilly[6] cited two cases of fatal peritonitis following simple ligation and drop technic. At autopsy an abscess was seen to have developed around the ligated stump, weakening the layers and causing infiltration of the cecal wall. After the administration of an enema the ligated stump blew up, permitting

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fecal contents to escape into the peritoneal cavity.

2. *Ligation and Inversion Method:* This so-called classic appendectomy, which consists of ligation at the base and inversion of the stump through a purse string at the cecum around the base, the mesoappendix then being tied over it, is the most common procedure and is still practiced by many surgeons. One of its modifications, now being performed by Estrada[8] and some of the resident surgeons in the Philippine General Hospital, is the addition of a re-enforcing secondary purse-string or figure-of-eight suture over the inverted stump before the mesoappendix is tied over it. We admit that this is much safer than simple ligation and far superior to it, but it is also far from ideal and is therefore objectionable. In the first place, it makes a closed sac of the appendical stump within the cecum, so that there is always danger of an intramural abscess. In a contaminated stump a localized suppurative process is prone to develop, which may rupture and become generalized. These complications have been observed and reported by several surgeons and investigators (Hartolomie,[9] De Martel,[10] Robertson[11] and Herman[12]). The danger becomes more apparent when one realizes the fact that necrotic tissue and abscess formation were observed in every instance in experimental animals examined on the fourth post-operative day, as reported by Kross[13] of New York and later verified by Yin and Lin[14] of China. Furthermore, experimentally and clinically, it has been found that adhesions are more extensive with this technic than with any others. We have also observed that many patients operated on in this manner complained of epigastric pain during the first few days after operation so distressing that they are forced to stay in bed in spite of orders to get up early. In addition, they usually come back for relief of the same right-sided pain several days or weeks after operation.

These two technics were condemned as early as 1889 and 1895 by Treves,[15] Morris,[16] Fowlers,[17] Eliot,[18] Dawborn,[19] Edibohls[20] and others, because of the danger of intestinal obstruction, adhesions and abscess formation in the cecal wall.

3. *Intraluminary Invagination, or Inversion Without Ligation:* Theoretically this is the best method, because there is serosa-to-serosa apposition without pocket formation in the cecal wall. Experimentally, as done by Yin and Lin[11] in rabbits, it showed the best healing with few or no adhesions and with but little sloughing on the inside. Macroscopic and microscopic studies of the stump, as done by Barkley de la Camp[21] and by Lin and his associates, showed only small necrotic spots, no hemorrhagic spots and very few adhesions, if any at all.

Ochsner and Lilly,[6] after making an exhaustive review of the literature and weighing the advantages and disadvantages of the various technics, came to the conclusion that inversion without ligation is the ideal technic provided that the stump can be converted without contamination of the peritoneal cavity and that hemostasis can be adequate. They contended that the possibility of occasional but fortunately rare catastrophes contraindicates the use of these two technics, as they are neither surgically nor physiologically sound, and that, although in most instances the patient will recover, the morbidity is likely to be greater and the complications more frequent. They devised a technic called the "three-clamp method," in which the appendix, without ligation, is grasped at the base by three Rankin clamps, one above the other. The appendix is amputated between the upper and the middle clamp. By releasing the middle clamp and holding the stump on the resulting grove, the surgeon invaginates the stump through a previously applied purse-string suture around the cecum, after releasing the lower one. Bleeding is prevented by a loop made at the mesenteric attachment during the application of the purse string, and this takes care of any intramural branch of the appendical artery. Our only objection to this technic is the fact that, in addition to the difficulty of holding four clamps, including the one at the tip of the appendix, with one hand, there is danger of leakage from the unligated stump while the third clamp is being removed to exchange it for a small tissue forceps for inversion.

Another method is that advocated by Stratte,[22] who applied a granny knot at the base of the appendix, cut it between two Rankin clamps, invaginated the stump through a

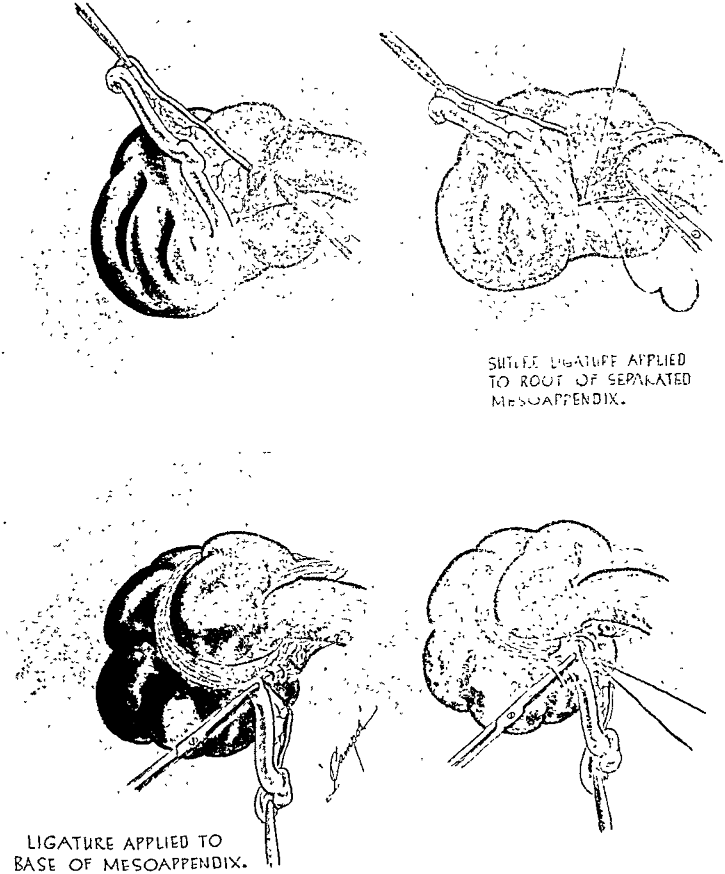

Fig. 1.—Modified treatment of appendical stump.

previously applied purse string suture around the cecum, and tightened the purse string while holding the first clamp vertically. This technic attempts to meet the intraluminary requirement by expecting the granny *knot* to give way into cecal lumen a few hours after operation. We doubt, however, whether this end is attained.

Authors' Technic: To obviate these difficulties and objections, we devised our o technic, which, although a modification Stratte's, we have found ideal in that it fu fecal contents to escape into the peritoneal cavity.

2. *Ligation and Inversion Method:* This so-called classic appendectomy, which consists of ligation at the base and inversion of the stump through a purse string at the cecum around the base, the mesoappendix then being tied over it, is the most common procedure and is still practiced by many surgeons. One of its modifications, now being performed by Estrada[5] and some of the resident surgeons in the Philippine General Hospital, is the addition of a re-enforcing secondary purse-string or figure-of-eight suture over the inverted stump before the mesoappendix is tied over it. We admit that this is much safer than simple ligation and far superior to it, but it is also far from ideal and is therefore objectionable. In the first place, it makes a closed sac of the appendical stump within the cecum, so that there is always danger of an intramural abscess. In a contaminated stump a localized suppurative process is prone to develop, which may rupture and become generalized. These complications have been observed and reported by several surgeons and investigators (Hartolomie,[9] De Martel,[10] Robertson[11] and Herman[12]). The danger becomes more apparent when one realizes the fact that necrotic tissue and abscess formation were observed in every instance in experimental animals examined on the fourth post-operative day, as reported by Kross[13] of New York and later verified by Yin and Lin[14] of China. Furthermore, experimentally and clinically, it has been found that adhesions are more extensive with this technic than with any others. We have also observed that many patients operated on in this manner complained of epigastric pain during the first few days after operation so distressing that they are forced to stay in bed in spite of orders to get up early. In addition, they usually come back for relief of the same right-sided pain several days or weeks after operation.

These two technics were condemned as early as 1889 and 1895 by Treves,[15] Morris,[16] Fowlers,[17] Eliot,[18] Dawborn,[19] Edibohls[20] and others, because of the danger of intestinal obstruction, adhesions and abscess formation in the cecal wall.

3. *Intraluminary Invagination, or Inversion Without Ligation:* Theoretically this is the best method, because there is serosa-to-serosa apposition without pocket formation in the cecal wall. Experimentally, as done by Yin and Lin[14] in rabbits, it showed the best healing with few or no adhesions and with but little sloughing on the inside. Macroscopic and microscopic studies of the stump, as done by Barkley de la Camp[21] and by Lin and his associates, showed only small necrotic spots, no hemorrhagic spots and very few adhesions, if any at all.

Ochsner and Lilly,[6] after making an exhaustive review of the literature and weighing the advantages and disadvantages of the various technics, came to the conclusion that inversion without ligation is the ideal technic provided that the stump can be converted without contamination of the peritoneal cavity and that hemostasis can be adequate. They contended that the possibility of occasional but fortunately rare catastrophes contraindicates the use of these two technics, as they are neither surgically nor physiologically sound, and that, although in most instances the patient will recover, the morbidity is likely to be greater and the complications more frequent. They devised a technic called the "three-clamp method," in which the appendix, without ligation, is grasped at the base by three Rankin clamps, one above the other. The appendix is amputated between the upper and the middle clamp. By releasing the middle clamp and holding the stump on the resulting grove, the surgeon invaginates the stump through a previously applied purse-string suture around the cecum, after releasing the lower one. Bleeding is prevented by a loop made at the mesenteric attachment during the application of the purse string, and this takes care of any intramural branch of the appendical artery. Our only objection to this technic is the fact that, in addition to the difficulty of holding four clamps, including the one at the tip of the appendix, with one hand, there is danger of leakage from the unligated stump while the third clamp is being removed to exchange it for a small tissue forceps for inversion.

Another method is that advocated by Stratte,[22] who applied a granny knot at the base of the appendix, cut it between two Rankin clamps, invaginated the stump through a

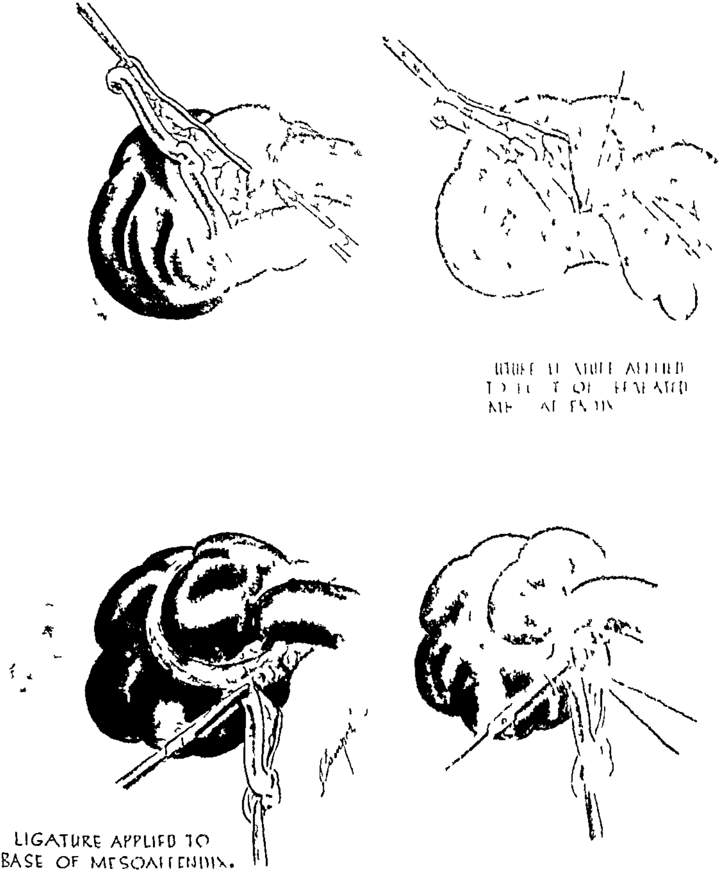

Fig 1 [illegible]

previously applied purse string suture around the cecum, and tightened the purse string while holding the first clamp vertically. This technic attempts to meet the intraluminary requirement by expecting the granny knot to give way into cecal lumen a few hours after operation. We doubt, however, whether this end is attained.

Authors' Technic. To [illegible] these d[illegible]ficulties and objectio[illegible] technic which, [illegible] Strattes we h[illegible]

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Androgens in Incurable Breast Cancer

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ANY surgeon treating cancer of the breast inevitably comes to the day a few years after having done what he thought was a nearly perfect radical mastectomy, when the patient returns with distant metastases The radiologist reports that the *patient has had all the x ray she can take and* a prescription is written for a narcotic with the words, *Exception 1 Article 117*

Now, in some instances we are able to administer temporary relief Some patients gain weight, some have their pain relieved without the use of narcotics and some return to gainful occupations for varying lengths of time We are able to delay that day when we write the narcotic prescription The use of large doses of testosterone is the method of temporary relief

The first article on this subject appeared in European literature in 1939 Loeser[1] made some observations while treating 2 women with testosterone because of their metrorrhagia He noted a slowing in metastases from breast cancer while the patients were under testosterone therapy Two years later he took two groups of rats having the same parentage and who were quite susceptible to developing breast cancer In one group he implanted testosterone and the other group he used as controls In the control group, 9 of the 12 died of cancer of the breast while only 4 of the 10 in the implanted group died

Ulrich[3, 4] also reported in 1939 the treatment of advanced breast cancer with androgens

In 1944 Fels[5] concluded that the hormone has no direct effect on the carcinomatous cells, but that it causes an extraordinary proliferation of fibrous tissue which impedes and blocks its extension

Adair[6] and Herman championed this cause with several favorable reports which have been backed by the almost unlimited facilities of the Memorial hospital New York We[8] published a preliminary report of our experience with testosterone in far advanced breast cancer in the *Southern Surgeon* March 1948 This paper is the follow up of that report

The theories as to the actual 'modus operandi' are yet quite theoretical Auchincloss has reported on a patient developing cancer of the breast following large doses of estrogen Heiberg[10] noted that the incidence of mammary cancer is higher in women during late menopause (when their cells have been under influence of estrogen longer), Herrell[11] reported that bilateral oophorectomy exerts a protective influence against breast cancer, Halberstaedter and Hechman[12] showed that irradiation induced menopause exerts a favorable response in breast cancer metastasis In October, 1948 Gregory[13] reported that monkeys developed cancer of the breast when given a certain virus if there was an excess of estrogen

Hoffman[14] summarized the relationship of estrogen to the hydrocarbon carcinogens as follows that both are growth stimulants and that apparently both can cause cancer in certain individuals—the estrogen in sex tissues only, the carcinogens in other tissues Loeb[15] states that "estrin causes cancer formation in certain tissues because it acts as a specific potent growth stimulus on these tissues, and that its chemical relationship to some carcinogenic hydrocarbons is not the essential factor "

Apparently the following scientific fundamentals speak in favor of androgens in halting breast cancer growth Certain mice probably develop cancer[7] when very large doses of estrogen are administered In humans too much estrogen may lead to benign changes[16] i e chronic mastitis Estrogen either alone or in combination with other forces may cause breast cancer in humans[17] Certainly it causes an increased growth of sexual tissue[18] and since the cancer of the breast is of the sexual tissues it causes its growth to be more rapid[1] Testosterone in excessive doses causes a temporary block of the anterior pituitary and in this way halts production of gonadotropin, which

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in turn stops production of estrogen in the body. In our previous report[6] we showed that those individuals in whom androgens produced complete absence of estrogenic effect on the vaginal mucosa fared much better than those individuals who continued to show estrus effects. During the last two years we treated 20 women who had hopelessly far advanced carcinoma of the breast with varying amounts of testosterone. We noted many details in these cases and will present some of their more salient factors.

We divided them into two groups (table 1, 2). One group had some definite palliation; the second group either failed to improve or had only little help. It is hard, as you must realize, to predict with any degree of certainty what any individual case of far advanced malignancy will do so far as length of life, amount of pain and suffering—yet you can roughly prognosticate as to their course. We have been strict in our classification of these people. All of the patients placed in the palliated group must have shown real improvement, i.e., either voluntarily omitted morphine, gained considerable weight, stopped forming fluid in the abdomen or chest, shown recalcification of osteolytic lesions on roentgen examination, had lessening of activity of growth on biopsy, or shown a definite tangible evidence of a malignant ulcer becoming smaller.

TABLE 1—PALLIATED

	Name	Age	Meno	Type CA	Met	Estrog	MG Androg
1.	ERM	39	A	Sc	B		9,000
2.	ARP	45	43	Sc	B	0	6,500
3.	ALB	53	A		B-s	0	14,000
4.	JBS	55	45	Sc	S	0	10,000
5.	JWV	58	45	Di	S	0	2,000
6.	BC	64	45		B	0	3,000
7.	MS	65			B-s	0	1,500
8.	CMO	65		Di	B-s		9,000
9.	WCF	65	40	Di	S	0	1,500
10.	JWM	76			B		2,540
11.	BAF	75	48	Pag.	S	0	4,175

55% AV. 59

TABLE 1: Summarizes the palliated patients—shows age at beginning of treatment, age of menopause, type carcinoma, location of metastases, estrogen effect on vaginal mucosa after treatment and total dosage of testosterone.

TABLE 2—UNIMPROVED

	Name	Age	Meno	Type CA	Met	Estrog	MG Androg
1.	IM	36	A	Di	S		2,000
2.	CWF	41	A		S		1,760
3.	MH	43	A	Ad	B-s		2,000
4.	WCT	52	46	Sc	B-s		3,500
5.	RHC	54					600
6.	WWH	55		Du	S		2,000
7.	OLG	55	43	Du	B-s		1,200
	(a)						
8.	EM	57		Sc	B-s		3,000
9.	LSF	59	53	Inf	S		4,000

45% AV. 50

TABLE 2: Summarizes the unimproved patients—shows age at beginning of treatment, age of menopause, type carcinoma, location of metastases, estrogenic effect on vaginal mucosa after treatment and total dosage of testosterone.

CASE REPORTS

Case 1: Female, age 55. She had a radical mastectomy because of scirrhous carcinoma in February, 1946. This was followed by 6000-r deep therapy. Early in 1947 her local physician gave her some estrogen which caused vaginal bleeding and shortly thereafter she began having pain in her hip. On admission, May, 1947, she had multiple metastasis to the pelvic bones (Fig. 1A). She couldn't walk because of her pain. She had almost complete relief after 500 mg. testosterone. In September she returned after receiving 3000 mg. She reported that she was working in the field every day digging potatoes. The x-ray showed some recalcification of the pelvic bones (Fig. 1B). Her blood calcium varied between 12 and 13 mg. percent after having been 8 mg. percent before beginning testosterone. Her vaginal smear showed absence of estrogen and her libido was increased a "right smart," so she said. In June, 1948 she returned saying that in the last three weeks she hadn't been feeling too well. She had a total of 6500 mg. and now had metastasis to the liver and lungs. She died in July, 1948, probably living longer, and more worthwhile without suffering because of testosterone.

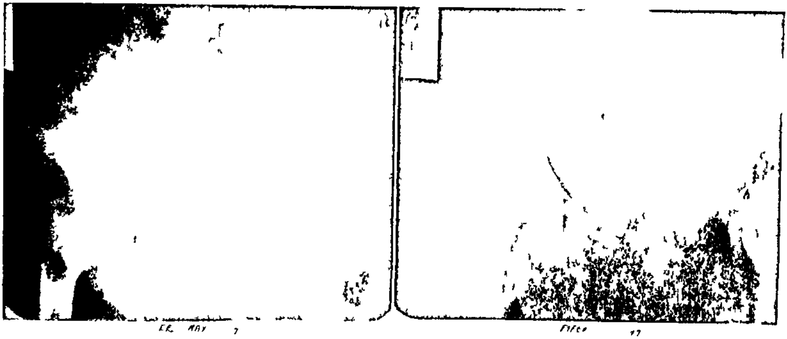

Fig 1 (Case 1)—Left pelvis showing osteolytic areas in left ilium Right, pelvis showing increased calcification throughout

Case 2 Female age 39 This patient had a partial mastectomy elsewhere which revealed scirrhous carcinoma She was referred to us in June 1944 and a radical mastectomy was done She had x ray castration at that time, as well as x radiation of the chest and axilla In February, 1946 she had bony metastasis which was controlled by x ray She had trouble again in April 1947 requiring crutches and morphine for pain X ray of her pelvis showed several osteolytic areas (Fig 2A)

She received 50 mg testosterone daily She had complete relief after taking 450 mg, threw her crutches away and continued to gain weight Vaginal smear showed slight estrogen activity In August, 1947 her hip showed even greater destruction She was advised to use her crutches against her will In November, 1947 she had pain on movement of her hip Her general health remained apparently good She was seen again in October, 1948 She was bedridden and had been in a wheel chair until recently with no particular pain She had lost no weight, but had many osteolytic lesions of almost every bone in her body (Fig 2B) and in recent weeks had begun the use of demerol at intervals She had a total of 9000 mg testosterone and in November was the picture of health (Fig 2C)

Certainly testosterone lengthened her life and made her more comfortable During this course her calcium has remained near 10 mg percent and phosphorus between 3 and 5 mg percent

Case 3 Female, age 65 She had a normal menopause at the age of 45 She had noticed a lump in her breast for some time and finally was brought to us in May, 1947 with terrific backache, which caused her to be bedridden Examination showed a mass 4 x 4 cms with typical orange peel skin of the breast and collapse of several vertebrae She was placed in a brace and was given 50 mg testosterone each day—with marked improvement and alleviation of her pain Now she is working every day, still wears a brace, and there has been a reduction in the size of the mass, which now measures 1 2 cms All of the orange peel appearance of the skin had disappeared She received a total of 4000 mg testosterone, which has given this lady 17 months of pain free, useful living

Case 4 Female, age 55 She had normal menopause at the age of 45 In January, 1945 she had

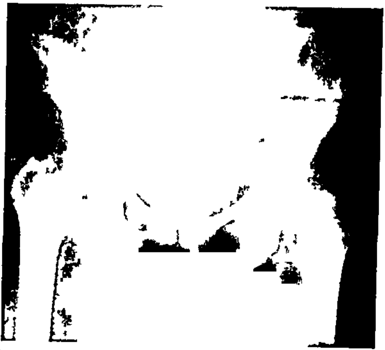

Fig 2 (Case 2)—Pelvis with osteolytic areas, especially on right ilium

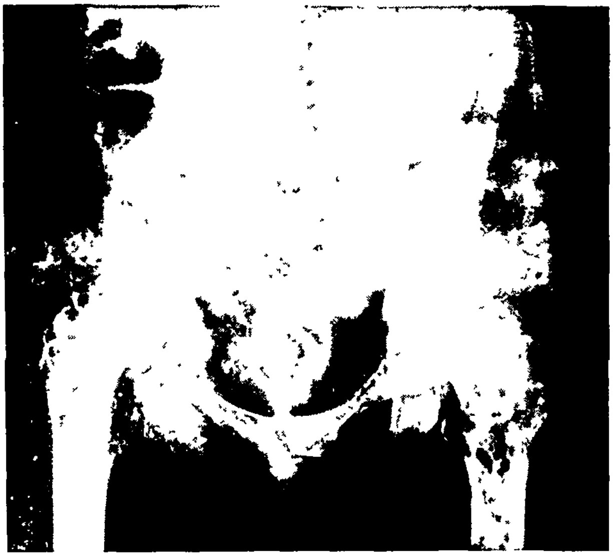

Fig. 3 (Case 2).—Roentgenogram showing complete destruction of pelvis.

a radical mastectomy because of a scirrhous carcinoma, followed by x-ray therapy. In October, 1946 she had pleuritic pain and her chest film showed a typical snow storm of metastatic carcinoma (Fig. 3A). She received maximum x-ray radiation, and by December, 1946 there was little change in her condition and she was started on testosterone.

After ten days her pain was gone and in the next month she gained 7 pounds. She began dieting to check her weight. She passed a kidney stone in February, 1947 at which time her blood calcium was 12 mg. percent. Her x-ray showed marked improvement (Fig. 3B).

In July, 1947 she talked us into stopping the testosterone, but within a month she developed fluid in her pleural cavity and on 50 mg. testosterone daily the fluid was reabsorbed in about two weeks. Her vaginal smear remained negative for estrogen. She worked at her regular employment from December, 1946 until April, 1948, when she had a return of chest fluid which was not reabsorbed even after more x-ray therapy. She died in May, 1948. Her complaints were shortness of breath and trouble swallowing. She never had any pain until just before her death.

Case 5: Female, age 53. She had a radical mastectomy on the right side in 1941. In 1945 she had a left radical mastectomy. In May, 1946 she was still menstruating and had abdominal metastasis with considerable fluid, which required that several thousand ccs. of fluid be removed by paracentesis every week. There were cancer cells in this fluid. She was given x-ray sterilization. She did very well until early in 1947, but by June she was entirely bedridden. Her last weight, before becoming bedridden, was 103 pounds. At this time she had lost more weight and we advised her to take 50 mg. testosterone daily. She now has had 14,000 mg. and weighs 160 pounds, has a male voice and whiskers. She says her libido is "like a bride." She is now taking 50 mg. twice each week as a maintenance dose. She has just returned from a trip North and is enjoying an apparently normal life.

Case 6: Female, age 65, menopause at 40. After having a mass in her breast for several years she finally consented to radical mastectomy because of a diffuse carcinoma. She had recurrence on the chest wall, and after the first few refused further x-ray treatment. When first seen she had considerable shortness of breath with fluid in her chest and a large ulcer on her left chest measuring 14 x 8 cms. She was started on 50 mg. testosterone each day, but took a bad cold and had considerable difficulty breathing. After a thoracentesis she did fairly well, her ulcer was clearing and becoming smaller.

During this time she had much family trouble. Her husband tried to commit suicide and while both were in the hospital someone burglarized her home. As a result she was upset, refused medicine and food. This was followed by her rapid demise. The ulcer at the time of her death was clean and measured 10 x 6 cms. A biopsy taken before beginning treatment and on the day of her death shows marked difference. Fig. 4A is a high power

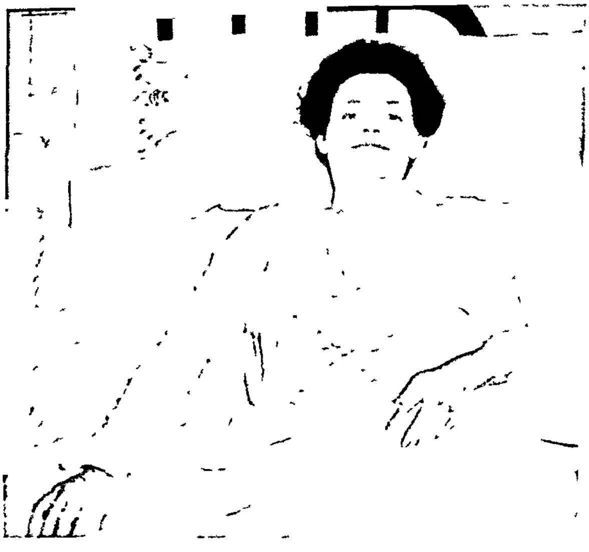

Fig. 4 (Case 2).—General good appearance of patient at the same time the roentgenogram (Fig. 3) was taken.

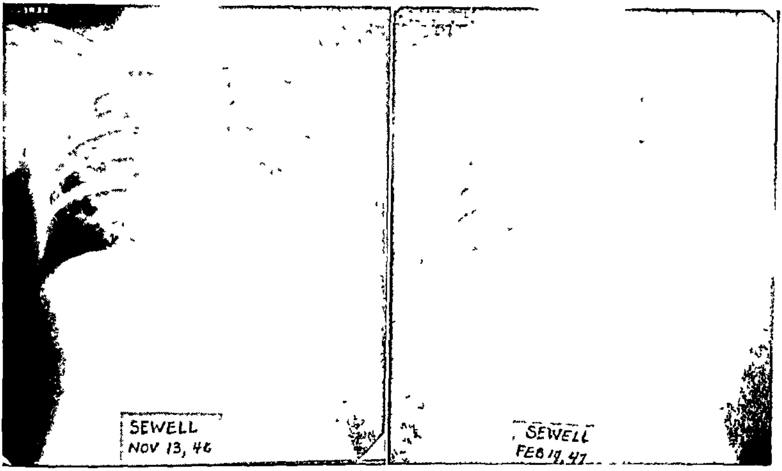

Fig 5 (Case 4) —Left, typical "snowstorm" appearance of metastases to chest Right, decrease of pulmonary metastases

view before treatment showing large vesicular nuclei containing well defined nucleoli, while Fig 4B is a slide after treatment showing the cells to be pyknotic and less active This was after only 1500 mg testosterone Her vaginal smear showed no estrogenizing activity

Case 7: Female, age 58, menopause at 45 She had a painless lump in her breast for sometime and finally it ulcerated and bled alarmingly It was then that she sought medical attention She had a dirty ulcer on the left breast measuring 12 x 14 cms with nodes in the axillae, but no lung metastases She was given 50 mg testosterone daily After 2000 mg the nodes in the axillae were smaller, the ulcer was cleaner and smaller A radical mastectomy was done to remove the offensive ulcer and the area skin grafted She was given postoperative x-ray treatment and is doing fine at present We believe that testosterone made her ulcer smaller and cleaner, yet microscopically the cells are still active

Case 8 Female, age 36 She had a radical mastectomy for diffused carcinoma in August, 1947 followed by x-ray therapy and sterilization In June, 1948 she showed metastases to the lungs She has received x ray treatment to the maximum, as well as over 2000 mg testosterone, with no alleviation Her vaginal smear has shown estrogenic effects on the vaginal mucosa constantly

Case 9· Female, age 55 She had a radical mastectomy in June, 1943 followed by x-ray therapy In May, 1948 she returned with abdominal pain and partial intestinal obstruction She had a primary cancer of the cecum and metastases to the liver, which were histologically from the breast. She received over 3000 mg. testosterone without alleviation except that at first she gained some weight She died in November, 1948 and her vaginal smear showed estrogenic effects throughout

Case 10: Female, age 57. She had a radical mastectomy five years ago In January, 1948 she noticed pain in her hip, which proved to be a metastases She was given x-ray therapy. In March she suffered a pathological fracture of her hip, which was nailed with a Smith Peterson pin. The next week we were called in consultation Her blood calcium was 13 mg. percent. We felt that this might be due to the orthopedic procedures and started her on 50 mg testosterone daily. After receiving 1500 mg. testosterone she had almost complete shutdown of her kidneys, her blood calcium was 16 mg percent Testosterone was omitted and fluids forced Her urine returned to normal volume and by the end of the week her NPN, which had risen to 54 mg. percent, returned to 32 mg percent Her blood calcium dropped to 12 mg. percent.

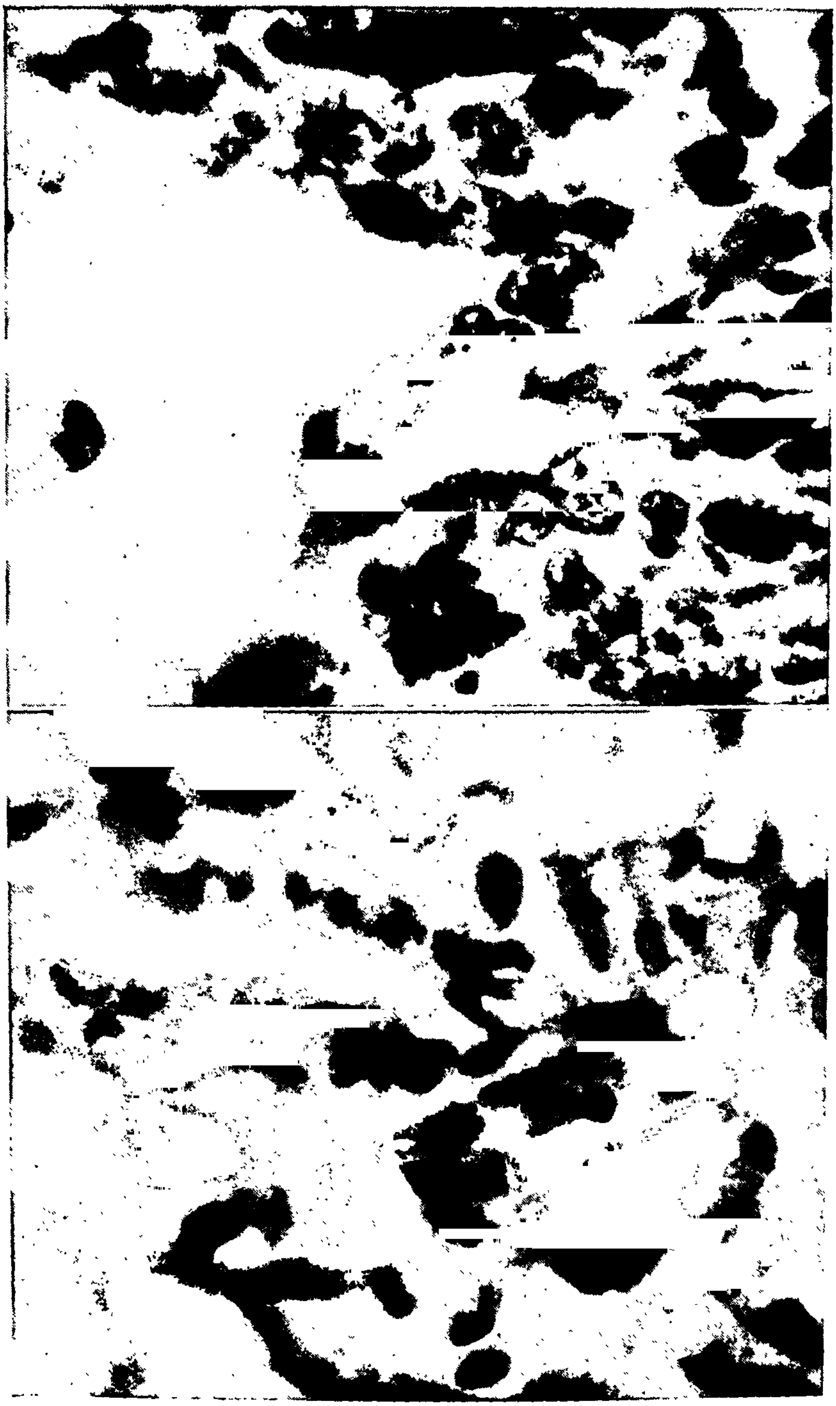

Fig. 6 (Case 6).—Top, high power photomicrograph of biopsy specimen before treatment. Most of the nuclei are large and vesicular. Nucleoli are present. Bottom, high power photomicrograph of biopsy specimen after treatment, showing increased fibrous tissue and pyknotic nuclei.

She was placed on Teropterin, but her course was steadily worse and she died about two months later. We believe the high calcium caused her low-reserve kidneys to suffer insult and shut down. Her vaginal smears showed estrogen activity in spite of the 1500 mg. testosterone.

Case 11: Female, aged 55, menopause at 43. The patient had radical mastectomy in May, 1944 for duct carcinoma, followed by postoperative x-radiation. In October, 1944, she develop[illegible] metastases in her lung and spine, which were tre[illegible] with 4700 r without effect. In February she [illegible] started on testosterone. Her course was rapi[illegible] downhill. She received a total of 1200 mg. te[illegible]erone before she died in May, 1947.

Case 12: Female, age 52, men[illegible] at 46. She had undergone a radical mastect[illegible] in December, 1946, because of [illegible]. She had widespread bone and soft ti[illegible] metastases by March, 1947, and was started [illegible] 50 mg. testosterone per day. X-ray showed [illegible] destruction of her ribs. Her alkaline ph[illegible] was [illegible] Bodansky units. She had [illegible] pain, but any respiratory [illegible] caused considerable suffering. After [illegible] she still had distress and a new metasta[illegible] leg. The blood calcium 14.4 mg. percent, pho[illegible] 3.6 mg. percent, alkaline phosphatase 23 Bodansky units. A vaginal smear showed [illegible] and she had some tibial edema. The x-ray showed some new bone formation along the [illegible] destruction. She died in September, 1947.

Case 13: Female, age [illegible] presented herself to the [illegible] with a typical inflammatory carcinoma. She was given 4500 r and six weeks later there was [illegible] breast except for [illegible] given 50 mg. testosterone da[illegible]. After [illegible] mg. the breast was markedly [illegible] and after 2[illegible] mg. the breast was [illegible] tion from her x-ray therapy. The breast was slightly [illegible] vague [illegible] nipple. The calcium was [illegible] mg. percent, phosphorus 3.3 mg. percent. The vaginal [illegible] questionable estrogenic effect, [illegible] able effect may have been due to her [illegible] instead of to the testosterone alone. She received a total of [illegible] mg. testosterone. In [illegible] 1947, her [illegible] rapid decline.

Out of the [illegible] (Table 1, 2) 11, or [illegible] palliated [illegible] slightly improved [illegible] questionable [illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

form of treatment, and in some individuals there is a temporary recalcification of osteolytic areas.

4. Deleterious effects may follow if testosterone is given individuals who show an abnormally high blood calcium prior to starting treatment. This is the only contraindication we have noted.

5. Testosterone, to be effective, should be given in fairly large dosage. If the patient responds, the value received is well worth the cost involved. In the patient who has palliation, the testosterone should be continued in a maintenance dose large enough to prevent estrogenic effects of the vaginal mucosa. Hirsutism, deepening of the voice and increased libido are to be expected in these cases.

SUMARIO

1. Las preparaciones de testosterón no curan el cáncer de la mama, pero sí aparentemente aminoran su crecimiento en algunos pacientes. En esta serie, 55% de los pacientes mostraron cierto grado de (aliviación) alivio.

2. El efecto paliativo del testosterón en esta enfermedad, se puede anticipar en los pacientes que responden a su administración mostrando falto de efecto estrogénico de la mucosa vaginal.

3. Los pacientes con metástasis oseas, aparentemente, responden más favorablemente al testosterón, y algunos aún muestran evidencia de recalcificación temporal de las areas oseolíticas.

4. Efectos deletéreos que puedan seguir el uso de esta droga, generalmente ocurren en pacientes que tienen una tara alta del calcio del suero de la sangre, antes de la institución de este tratamiento. Por lo tanto, ésta es la única contraindicación que nosotros hemos notado.

5. Sólo las dosis elevadas de testosterón son efectivas. Si el paciente responde favorablemente (valor paliativo) se debe de continuar su administración en dosis suficientes para prevenir el efecto de los estrógenos sobre la mucosa vaginal. Es natural el esperar que estos casos sufran de hirsutismo y de otras manifestaciones de virilismo y de exageración del líbido.

RÉSUMÉ

1. Le testostérone ne guérit pas le cancer du sein, mais apparemment il en ralentit l'évolution chez un certain nombre de malades. Dans cette série de cas, 55% ont été quelque peu soulagés.

2. On peut attendre une amélioration de la maladie chez les malades qui répondent à l'administration de testostérone par une absence d'effet œstrogène sur la muqueuse vaginale.

3. Les malades présentant des métastases osseuses sont plus disposés à répondre à cette forme de traitement et dans quelques cas on observe une récalcification temporaire des zones ostéolysées.

4. On peut observer des conséquences fâcheuses, si l'on donne le testostérone à des individus présentant une teneur en calcium sanguin en dehors de la normale avant de commencer le traitement. C'est la seule contre-indication que nous avons observé.

5. Le testostérone, pour être éfficace, doit être administré à doses suffisamment importantes. Si le malade répond, le résultat que l'on obtient en échange vaut bien la dépense engagée. Chez les malades qui ont des améliorations, le testostérone doit être continué à doses suffisamment importantes pour empêcher les effets œstrogènes sur la muqueuse vaginale. On doit, s'attendre dans ees cas à l'apparition de l'hirsutisme, de la tonalité grave de la voix, et à l'accroissement du désir sexuel.

RIASSUNTO

1—Il testosterone non guarisce il cancro della mammella, ma sembra ritardare in taluni pazienti lo sviluppo del tumore. Un'alleviazione dei sintomi si e' manifestata nel 55% dei casi curati dall'A.

2—Un effetto palliativo puo' essere previsto allorquando i pazienti rispondono al testosterone mediante la scomparsa di fenomeni estrogenici nella mucosa vaginale.

3—Rispondono meglio a questa terapia i pazienti con metastasi ossee: in taluni casi si stabilisce addirittura una ricalcificazione, sia pure temporanea delle zone osteolitiche.

4—Effetti dannosi possono risultare allor-

quando il testosterone venne somministrato in presenza di un tasso eccessivamente elevato di calcio nel sangue Questa e la sola controindicazione segnalata dall A

5—Per riuscire utile il testosterone va somministrato in dosi abbastanza elevate Se l effetto palliativo e' gia' stato raggiunto la dose va mantenuta in quantita tale da indurre sempre fenomeni estrogenici nella mucosa vaginale

In taluni casi possono insorgere irsutismo abbassamento del tono della voce ed accresciuta libidine

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Recognition is due to Dr Irving Greenberg Dr J J Clark and Dr R M Tankesley who have kindly permitted us to report several of their respective cases

Facts about the Transversalis Fascia
A Surgeon's Viewpoint

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KNOWLEDGE of the transversalis fascia is rather spotty. To most surgeons the transversalis fascia signifies and is coextensive with the aponeurotic sheath observed in the inguinal region. This is understandable when one considers that books on anatomy reluctantly allot one paragraph to graphic description of the transversalis fascia, and the description is limited to that segment of the fascia which is located in the inguinal region.

It should not be necessary to devote a paper to this subject. Wherever anatomy or surgical anatomy is taught, the transversalis fascia should be described in detail. However, if what is to be said of the transversalis fascia is true, certainly the transversalis fascia has possessed the property ever since the study of anatomy was born. Why teachers of anatomy have overlooked the coordination of this knowledge is inexplicable. It is the purpose, therefore, of this paper to describe in detail the distribution of the transversalis fascia throughout the body as observed in a large series of dissections on cadavers, to correlate the information and to point out the importance of this widespread abdominal tissue in the surgical repair of the abdomen and its contents.

Bassini was perhaps the first modern surgeon to call attention to the importance of the transversalis fascia. His descriptions of the inguinal canal and the repair of inguinal hernia rank as medical classics. As a consequence, the transversalis fascia in the region of the inguinal canal is generally appreciated from a surgical standpoint. The fibers of the fascia in this region are usually strong and well formed and constitute the posterior surface, or surgical floor, of the inguinal canal. There is little need to enlarge on the function of this inguinal fascia or on its relation to the production and repair of inguinal hernia. Every surgeon who has done inguinal herniorrhaphy has had experience with this fascia, irrespective of his specific knowledge of the structures of the inguinal canal. Here the fibers conify and thicken to produce the internal inguinal ring. They descend over the structures of the cord in a funnel-shaped manner to constitute what is known as the infundibuliform fascia. What has not received the emphasis it deserves is the fact that the infundibuliform fascia is also transversalis fascia (Fig. 1).

From the inguinal canal the fascia spreads laterally and upward. It ascends anteriorly over the entire under surface of the abdominal muscular wall until it meets the thin inner fascial covering of the muscles constituting the diaphragm. The fibers of the transversalis fascia thin out over the diaphragm and become intimately associated with the diaphragmatic fascia, especially the central part, to such an extent that it is extremely difficult to separate the two layers. This union is so compact, in fact, as to make almost a single structure of the two. Here one of the most interesting features of the transversalis fascia is observed. At each hiatal perforation where thoracic structures pass through to the abdominal cavity, fibers of the transversalis fascia encircle the perforating structures, forming a double conification not unlike the enclosure of the cord in the inguinal region. Some of the fibers ascend through the diaphragm into the thorax, producing an upside-down funnel reaching as high as 1½ inches (3.7 cm.) into the thorax. Other fibers descend along the perforating thoracic structure, likewise encircling it in a funnel-shaped manner. The teleologic aspect of such an arrangement is readily seen. It is a caulking off of the hiatal opening as an insurance against the penetration of either an abdominal viscus or a thoracic structure into one or the other compartment. Thus the aorta, the azygos vein, the thoracic duct, the esopha-

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Read at the Thirteenth Annual Assembly of the United States Chapter, International College of Surgeons, St. Louis, November 1948.

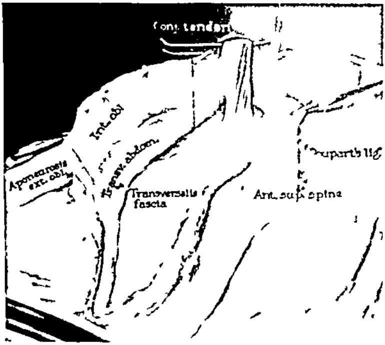

Fig 1—Anatomic drawing Note that th[illegible] ular fascia is continuous with th[illegible]

gus, the vena cava, the two greater and lesser splanchnic nerves and the hemiazygos vein are all surrounded, insulated and walled off by the encircling process of the transversalis fibers, which doubtless accounts for the relative infrequency of diaphragmatic hernia (Fig 2)

At the xiphoid process the fibers of the transversalis fascia follow the attachment of the diaphragm and merge with the fibers of the falciform ligament of the liver Posteriorly the fibers of the transversalis fascia descend over the diaphragmatic crura giving sprigs of attachment to the lumbar vertebrae and their transverse processes and merge laterally with the aponeuroses of the psoas major and the quadratus lumborum muscles At a level superior to the adrenal glands the fascia splits off an internal sheath, which passes forward in front of the kidney and its vessel Beneath the kidney the two sheaths again coalesce Thus an encasement membrane of the kidney is formed, to which several specific names have been given The most common of these names is Gerota's fascia (Fig 3)

Obviously, from a surgical standpoint it can be seen that a wandering kidney is the result of imperfect fusion or defective attachment of this specialized structural arrangement of the transversalis fascia Consequently repair of a dropped kidney presupposes an understanding of the structural arrangement, which determines the fundamental principle of kidney suspension (Fig 4)

When dissection of the fascia is carried posteriorly into the pelvis, it is seen that the aponeurotic covering of the iliac fossa owes the greater part of its strength to the arrangement of the transversalis fibers Because of the highly specialized character of this part of the body, all textbooks of anatomy go into considerable discussion of the fascia under the term "pelvic fascia" To tell the student that the pelvic fascia is also the transversalis fascia appears to be heresy, and consequently his memory and intelligence are strained to determine the purpose of the pelvic fascia and its relation to the other part of the body To say that the transversalis fascia forms the tendinous arch or the "white line" of the pelvis (Fig 5) is an unheard of doctrine Yet careful dissection will reveal the surprising continuity Here the fascia separates into several conspicuous layers The outermost layer is the fascial sheath of the obturator internus muscle, which is attached to the tuberosity of the ischium and is known generally as the obturator fascia In the pubic area it fastens to the pubic arch and blends with the corresponding layer of the opposite side to form the posterior layer of the triangular ligament The second or middle sheath, the ischiorectal

Fig 2—[illegible] of the arrangement of the transversalis fascia about [illegible] (fr[illegible] laterally

fascia, lines the under surface of the levator ani muscle, whereas the third or innermost sheath constitutes the rectovesical fascia and extends downward and inward over the upper surface of the levator ani muscle, completely encapsulating this structure. It then invests the bladder, the prostate and the rectum. It is the anterior and lateral reflection, or true ligament, of the bladder. It is the capsule of the prostate and covers the seminal vesicles and ducts. Ascending, it attaches to the inferior border of the symphysis pubis.

In a woman this innermost layer, which connects the rectum and the bladder, is perforated by the vagina and the urethra, but here again, wherever perforating organs exist, the fibers conify and encircle them, sealing off all possible exit of the pelvic structures. It is apparent that a break in continuity of the fascial fibers may permit the escape of these structures and cause the formation of a perineal hernia, such as a cystocele, a urethrocele or a rectocele.

From this point of view, it is easy for the student to visualize an all-encircling membrane re-inforcing the abdominal cavity and providing insurance against perforations or penetrations, even though specific names are given to it in relation to the different regions in which it is found (Fig. 6).

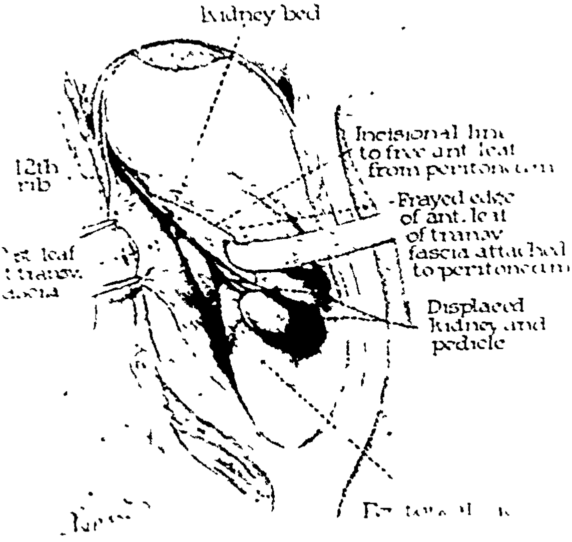
Kidney bed
12th rib
Incisional line to free ant. leaf from peritoneum
Frayed edge of ant. leaf of transv. fascia attached to peritoneum
Post. leaf of transv. fascia
Displaced kidney and pedicle

Fig. 3.—Separation of the transversalis fascia to form Gerota's fascia of the kidney. (Courtesy *Urologic and Cutaneous Review.*)

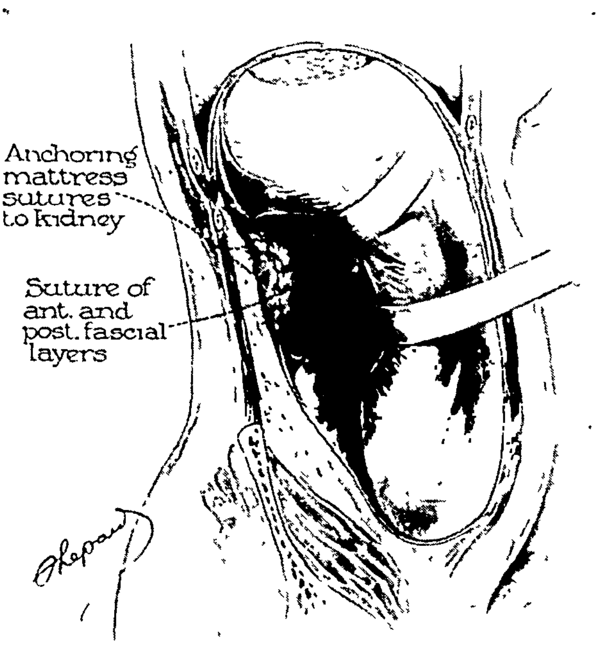
Anchoring mattress sutures to kidney
Suture of ant. and post. fascial layers

Fig. 4.—Nephropexy employing the sheaths of the transversalis fascia. (Courtesy *Urologic and Cutaneous Review.*)

When dissection is continued superiorly, the fibers are seen to ascend over the posterior surface of the symphysis pubis and merge laterally with the iliopectineal fascia.

At the crural arch the highly specialized function of walling off all potential avenues of exodus from the abdominal cavity is again demonstrated. The vessels and nerves that pass out onto the leg are encircled as in the diaphragm. The fascia splits into two divisions, one ascending along the structure and the other descending, completely insulating the vessels. The fascia, moreover, continues out onto the leg, contributing to formation of the fascia of that structure, and at the femoral ring a rosette-like arrangement of the fibers completely encloses the so-called empty space of the crural arch. Derangement of these fibers gives rise to femoral hernia.

On leaving the structures beneath the crural arch, the transversalis fascia gives off slivers of attachment to the inguinal ligament and then spreads out to form the surgical floor of the inguinal canal, as has been pointed out at the beginning of this article. Both halves of the abdominal wall are included in the description, the fascia demonstrating a continuity far beyond the expectation of either the surgeon or the anatomist

COMMENT AND SUMMARY

There may be some who will dispute the term "transversalis fascia" as applied to the all inclusive structure described This however is purely an academic question, and it is conceded to be a question for discussion The fact remains, however, that there is a structure in continuity with the structure admittedly called the transversalis fascia in the inguinal region That this structure is distributed as here described is beyond controversy whether one wishes to call it transversalis fascia, endo abdominal fascia intra abdominal fascia Gerota's fascia, pelvic fascia or any other name The theory which restricts the transversalis fascia to the posterior sheath of the transversus abdominis muscle is definitely out of order and throws on its proponents the necessity of explaining for example the continuity of the fascia of the pelvis or of the diaphragm

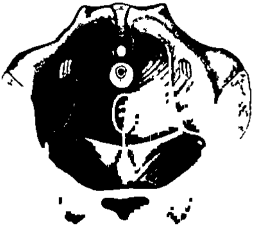

Fig 5 —Relation of the "white line" of the pelvis to the pelvic diaphragm (Modified from Campbell, W F A Textbook of Surgical Anatomy, Philadelphia, W B Saunders Company, 1921)

Pedagogically I reiterate a step forward could be taken by considering the fascia as an entity as a simple structural continuity to which specific names are affixed according to the specific location or function demanded of it Assuredly it is against all principles of good pedagogy to fail to recognize the structure as a unit generally distributed throughout the abdomen and the pelvis Furthermore, description of the fascia as a disjointed entity, separate and distinct restricted to a specialized location and without continuity, begs the question and overlooks one of nature's most brilliant strokes of planned teleology

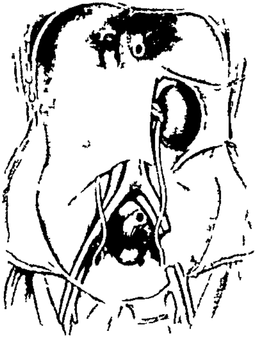

Fig 6 —Artist's illustration of a dissection showing complete distribution and continuity of the transversalis fascia throughout the body Note the encircling fibers about the structures that enter and leave the abdominal cavity (Courtesy *Archives of Surgery*)

RESUMÉ

Il y a des personnes qui discuteront l'emploi du terme "fascia transversalis" pour désigner la partie anatomique ainsi decrite Ceci est apparemment une question académique et peut permettre la discussion Néanmoins le fait evident est qu'il y a une partie anatomique en continuité avec l'e'lement anatomique généralement designé sous le nom de "fascia transversalis dans la région inguinale Comme l'existence de cet elément organisé comme nous le decrivons, est admise qu'on la designe sous le nom de "fascia transversalis' "fascia endo abdominal fascia intra abdominal, fascia de Gérota, fascia pelvien et autres dénominations la théorie qui limite le fascia transversalis a la gaine posterieure du muscle abdominal transverse n'est plus discutable, ceux qui

soutiennent se trouvent dans la nécessité d'expliquer la continuité du fascia du bassin et celui du diaphragme.

Je répète qu'il est désirable d'envisager ce fascia comme une entité, comme une simple continuité anatomique à laquelle des noms spécifiques sont donnés d'après l'emplacement ou la fonction qu'elle a. Vraiment, c'est contre tous les principes de bonne pédagogie, de ne pas reconnaître cette élément comme un tout, placé dans l'abdomen et el pelvis. Décrire le fascia, comme une entité disjointe, séparée, et distincte, limité à une emplacement spécial et sans continuité, est ignorer une des plus brillantes realisations de la nature.

RIASSUNTO

Sostiene che il concetto di limitare il termine di fascia trasversale alla fascia che riveste la faccia posteriore dei muscoli trasversali sia definitivamente superato, in quanto non puo' spiegare-per esempio-la continuita' con la fascia pelvica e la fascia diaframmatica. Nella regione inguinale esiste una fascia accuratamente descitta dall'A., che e' in diretta continuita' con la struttura comunemente denominata fascia trasversale. Questa fascia e' stata designata con i termini piu' svariati: fascia trasversale, fascia endo-addominale, fascia intraaddominale, fascia di Gerota, fascia pelvica, ecc.

L'A. ritiene che il termine di fascia trasversale comprenda una struttura complessa, distribuita generalmente a tutto l'addome e la pelvi: volendo sottilizzare, si potrebbe aggiungere a questo termine generica un suffisso. variabile a seconda della localizzazione e della funzione.

SUMARIO

Hay indubalemente, algunos autores que disputaran el uso del término "fascia del transverso abdominal" como designación de la estructura que se ha descrito en este artículo. Esto, sin embargo, es una cuestión puramente académica, y se concede que su uso invita a discusión. Por otra parte, no hay lugar a duda el hecho de que existe una estructura aponeurótica en la region inguinal, que es contínua con la fascia del transverso abdominal. Que esta estructura se distribuye tal como se ha descrito es innegable. No es de importancia el que se le de el nombre de fascia del transverso, fascia endo-abdominal, fascia intra-abdominal, fascia de Gerota o fascia pelvina, o por cualquiera otra designación. La teoría que restringe la fascia del transverso a la hoja posterior de este músculo no está en orden y presenta a sus exponentes con la responsabilidad de explicar, por ejemplo, la continuidad del tejido aponeurótico de la pelvis o de la superficie inferior del músculo diafragma.

Bajo el punto de vista pedagógico se debería de considerar a este tejido aponeurótico como una entidad definitiva, una unidad estructural que se extiende por el abdomen y la pelvis. Que reciba nombres específicos, según sus funciones locales, es permisible siempre y cuando se mantenga su unidad estructural. La desmembración de este tejido aponeurótico (fascia) en segmentos aislados implora la cuestión y falla de reconocer su verdadera naturaleza.

Case Reports

Atresia of the Duodenum in a Newborn Child

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CONGENITAL atresia of the intestine occurs more frequently than is realized. This particular anomaly is of interest to both the pediatrician and the surgeon, because successful treatment depends upon early operation. If the condition is unrecognized or neglected the patient will die within the first week of life from dehydration or peritonitis secondary to rupture of the distended and friable proximal loop of intestine. "The mortality for operative procedures on this entity is extremely high, and successfully treated cases are still rarities in the medical literature[1]." The following case of atresia of the duodenum in the newborn is added to the literature.

REPORT OF CASE

Baby G. was admitted to Children's Hospital, Denver, Colorado, on Jan. 11, 1947, three days after a normal birth. The obstetrician (D. M. M.) recorded that the mother had polyhydramnios. Shortly after birth it was noted that the baby vomited all of the liquids she had taken. The vomitus rolled out of the child's nose and mouth. It contained bile. The child's weight dropped from 6 pounds 10 ounces to 4 pounds 10 ounces. She had an icteric tinge. Physical examination revealed marked dehydration; the infant was breathing shallowly. The fontanels were sunken, and tissue turgor was gone. Examination of the heart and lungs gave negative results. The abdomen was distended and tympanitic. Most of the distention appeared to be in the left upper quadrant. Rectal examination revealed the presence of a soft mass felt with the tip of the finger through the cul de sac. A small amount of grayish inspissated stool was present on the gloved examining finger. Laboratory work revealed the following: The erythrocyte count was 6,100,000 per cubic millimeter of blood and the hemoglobin was 18 Gm. per 100 cubic centimeters. The white cell count was 32,800, with 50 per cent granulocytes. The urine contained 100 mg. of albumen per hundred cubic centimeters. The sediment showed 8 to 10 white cells and 20 to 25 red cells per high power field. Farber's test was not done. A roentgen film of the abdomen with a catheter passed into the stomach (Fig. 1) showed a large collection of gas, presumed to be principally in the stomach and duodenum. No gas was discernible in the colon. A roentgen diagnosis of high intestinal obstruction was made by Dr. Frank B. Stephenson.

Hospital Course. The infant was placed in an incubator and given continuous oxygen. A continuous intravenous drip was started. Saline solution, dextrose and plasma were given intravenously. Nothing was given by mouth, and a catheter was passed into the stomach and attached to a Wangensteen suction apparatus. On Jan. 12 the abdomen was opened through a right rectus incision, and atresia of the third portion of the duodenum was observed (Fig. 2). The intestine proximal to the atresia was markedly dilated. The intestine distal to the atresia was completely collapsed, and the bowel was only 4 or 5 mm. in diameter. Intestinal clamps were placed on the proximal and distal portions of the intestine, and the distal collapsed intestine was distended with air forced into the lumen through a Luer syringe and a fine needle. A posterior duodenojejunostomy was done, two layers of 00000 chromic catgut suture being used. The abdomen was closed in layers with fine catgut, cotton, and dermal suture material.

Postoperative Course. The infant's gastrointestinal tract was kept decompressed by continuous suction. Intravenous fluids were given. Nothing was given by mouth for the first forty eight hours. The Wangensteen suction was gradually discontinued, and very small feedings of diluted breast milk were instituted on the second postoperative day. On the third postoperative day small amounts of milk were regurgitated. The vomitus had a deep bile stain. A roentgenogram of the abdomen on the third postoperative day revealed the presence of gas in both the small and the large intestine. On the fifth postoperative day the infant began to pass normal stools and to retain all of her food

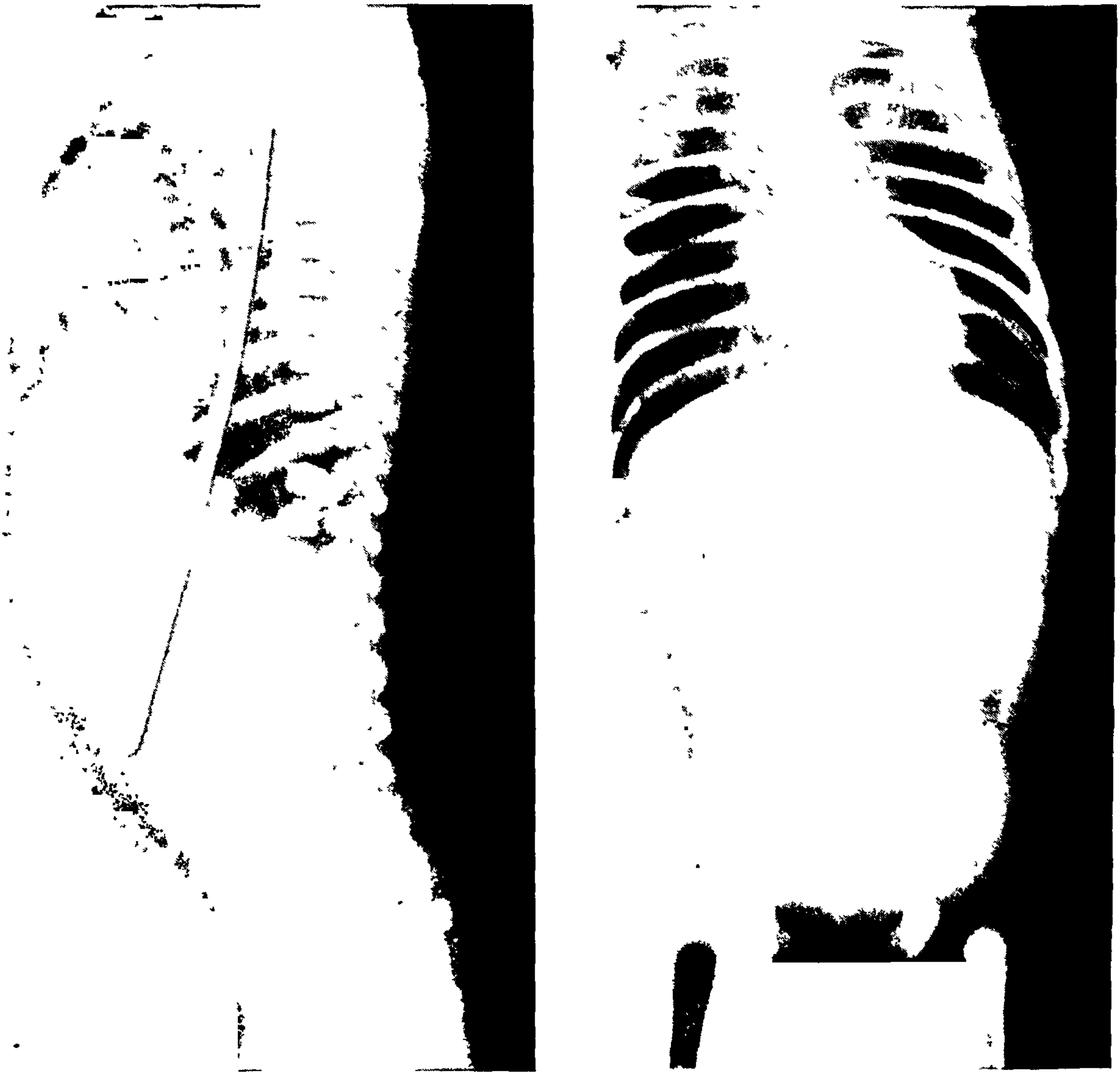

Fig. 1.—Preoperative roentgenogram of abdomen with tube in stomach, showing the dilated duodenum.

The formula was changed to evaporated milk, and she began to gain weight. On the day she was discharged from the hospital, Jan. 27, 1947, she weighed 5 pounds and 5 ounces. Her subsequent course has been entirely uneventful, and she is now a healthy, well developed child (Fig. 3).

COMMENT

Davis and Poynter[2] collected 392 cases of congenital atresia of the intestine. None of the patients recovered. Birgfield in 1928 reported 194 cases. Of these, 58 were cases of atresia of the duodenum, 103 of atresia of the small intestine, and 33 of atresia of the colon. There were only 2 cases in which successful operations had been done up to that time. In 1933, Ladd[4] reported 6 cases collected from the literature and 8 of his own cases in which some surgical procedure had been satisfactory. Brunazzi and Lyon[5] were able to find 12 cases of atresia of the small intestine successfully treated and added 1 of their own.

The successful treatment of congenital atresia of the small intestine depends upon early diagnosis, aseptic restoration of gastrointestinal continuity, and meticulous attention to the patient's water and electrolyte balance.

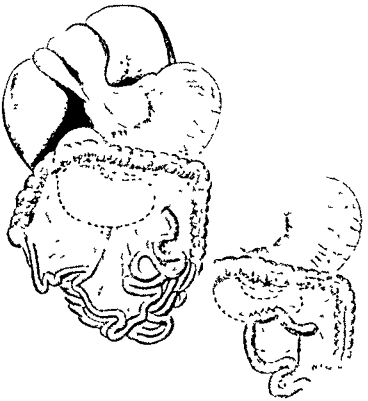

Fig. 2.—Artist's illustration of conditions observed at operation and of the corrective procedure.

The diagnosis is not difficult. The symptoms are those of intestinal obstruction; vomiting, pain, and some degree of abdominal distention. Vomiting begins immediately after birth and becomes progressively more voluminous as the interval increases. The nature of the vomitus depends upon the site of the atresia If above the ampulla of Vater, it may consist only of the material ingested. If below the ampulla of Vater, the vomitus contains bile. Bowel movement as a rule is scanty. In questionable cases, the absence of characteristic epithelial cells in the stool, as demonstrated by Farber's test, is highly significant.

In small children, especially the newborn, pain is hard to demonstrate. However, close observation will reveal that the child is uncomfortable, and short periods of rest attest the intermittency of the pain. Some degree of abdominal distention is present in every case of intestinal obstruction. The amount, of course, depends upon the location of the obstruction. Distinct patterning is not infrequent. In the case reported here, most of the distention was in the left upper abdominal quadrant. An early diagnosis is greatly facilitated by a flat plate of the abdomen.

The observations of Paine and Nessa[6] with regard to the distribution of gas in the gastrointestinal tracts of infants are significant and valuable in making an early diagnosis of any complete obstruction of the bowel in a child. These workers pointed out that gas is present in the sigmoid colon or in the rectum within four to six hours after the birth of any normal child A flat roentgenogram of the abdomen showing distended loops of bowel without gas in the colon and a negative result from Farber's test make it possible to diagnose atresia of the intestine any time after the sixth postnatal hour.

From the operative standpoint, the simplest procedure that will relieve the obstruction and restore the normal continuity of the bowel is

Fig. 3.—Ba[illegible] t tl[illegible] f 18 months.

the procedure of choice. For mechanical reasons, atresia of the third portion of the duodenum is best handled by an open posterior duodenojejunostomy. The distal loop can be distended with air or water, and an anastomosis (with two layers of 00000 chromic catgut) is easily accomplished. A closed anastomosis is impractical because of the minute size of the intestine, but any appreciable amount of soiling is fatal in these cases, the margin of safety being very narrow. Maintenance of fluid, electrolyte and protein balance is of extreme importance. In the case here reported, the attention given by the pediatrician and by the hospital staff to this matter was a most important factor in the successful outcome.

SUMMARY

A case of successfully managed congenital atresia of the third portion of the duodenum in a newborn is reported. Surgical treatment was limited to a posterior duodenojejunostomy.

RÉSUMÉ

On rapporte un cas d'atrésie congénitale de la troisième portion du duodénum chez un nouveau né, traitée avec succès. Le traitement chirurgical se limita à une duodénojejunostomie postérieure.

SUMARIO

Se ha reportado un caso de atresia congénita de la tercera porción del duodeno que fué tratado con éxito en el recién nacido. El tratamiento quirúrgico se limitó a la práctica de la duodeno-yeyunostomía posterior.

RIASSUNTO

Descrive un caso di atresia congenita della terza porzione del duodeno in un neonato. L'operazione, limitata ad una duodeno-digiunostomia posteriore, ha avuto un esito favorevole.

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Ischial Decubitus Ulcer with Atypical Features

A. ESTIN COMARR, M.D.
VAN NUYS, CALIF.

AMONG 120 surgical closures of ischial decubitus ulcers at this paraplegic center[1] an atypical bursal sac was found, of sufficient interest to warrant reporting.

The surgical closure of decubitus ulcers is of recent origin. A great number of decubitus ulcers have been seen in paraplegic patients since World War II. In the comprehensive literature there are only a few references to the ischial decubitus ulcer.

In a recent publication the etiology, anatomy, pathology, histology and surgical management of ischial decubitus ulcers have been discussed.[1]

REPORT OF CASE

A 33 year old white man was injured Sept. 15, 1943, by a shell fragment, sustaining a compound fracture of the twelfth dorsal vertebra. He underwent a laminectomy (from the twelfth dorsal to the third lumbar vertebra) shortly after the injury. At the time of his admission to this hospital motion in the lower extremities was limited to some psoas and sartorius action on the left side, with even less motility on the right side. Besides a trace of abduction and adduction in both lower extremities in the hip joint, motion was lost below the hip joints. Sensation to touch was lost below a line between the eleventh and twelfth dorsal vertebrae on the right and on the left below a line between the twelfth dorsal and the first lumbar vertebra. Sensation to pin prick was lost below a line between the eleventh and twelfth dorsal vertebrae bilaterally and vibration sense was lost below a level of approximately the tenth dorsal vertebra. Additional neurologic observations included weakness of the right hand due to residual conditions following severance of the right ulnar nerve at the medial bicipital sulcus at the time of injury to the spinal cord.

During the early part of September 1947 there was acute ischial bursitis demonstrated by diffuse redness of the skin, heat and swelling. On aspiration about 20 cc. of serosanguinous material was removed. Culture revealed alpha streptococcus and Bacillus proteus. Penicillin (200,000 units) was injected into the bursa. Thereafter, aspiration was done approximately every other day for a month, and each time approximately 10 cc. of the same material was obtained. During the following month the bursa was aspirated at intervals of three to four days. By the end of the second month the signs of inflammation had subsided and the patient was permitted wheel chair privileges. On December 4, nearly three months after onset of the bursitis, he was discharged from the hospital.

On September 15, 1948, the patient was readmitted for recurrence of the bursitis in connection with prolonged periods of sitting. On July 6 his family physician had incised the bursa for drainage, and since then it had been persistently draining.

Local examination revealed a large swelling over the left ischial area. There were no signs of acute inflammation. Pressure over the mass (which had a rather doughy consistency) caused clear serosanguinous material to escape from a sinus about 1 inch (2.5 cm.) superior to the gluteal fold.

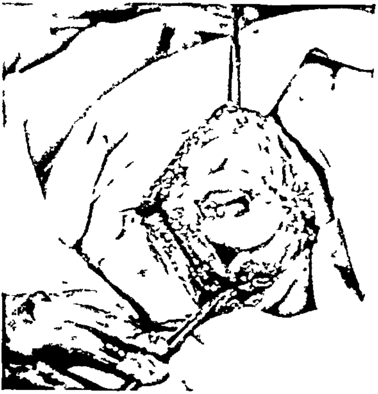

Fig. 1.—Ischial bursal sac with structures resembling small bowel.

From the Paraplegic Service of Birmingham Veterans Administration Hospital, Van Nuys, Calif.

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Accepted for publication Dec. 9, 1948.

Operation: On October 6 a removal of the bursal sac was contemplated, in accordance with previous experience[1]. A transverse elliptic cutaneous incision was made around the sinus tract. When the sac was opened, a great deal of serosanguinous fluid with white shreds of necrotic tissue was exuded. The expected smooth-walled cavity was absent; instead, structures were present which resembled small bowel with several discrete loops (Fig. 1). Although a herniation of bowel was unlikely, the contents of the bursa were first carefully inspected and then the entire sac, with its contents, was dissected out and eventually freed from its bony (ischial) attachment. After removal of the sac the ischial bone was exposed; this revealed little, if any, pathologic change on inspection, which was in concurrence with the roentgen evidence. This resulted in a large defect of the soft tissue over the ischial bone. The bone was exceptionally prominent. In view of these two observations, a subperiosteal ischialectomy was performed (Fig. 2). Hemostasis was accomplished by electrocoagulation. After removal of the ischial bone the deep soft tissues were easily coapted by a few catgut sutures. The skin was brought together with four widely separated stainless steel wires in order to give adequate drainage. No drains were used. A heavy fluff pressure dressing was applied.

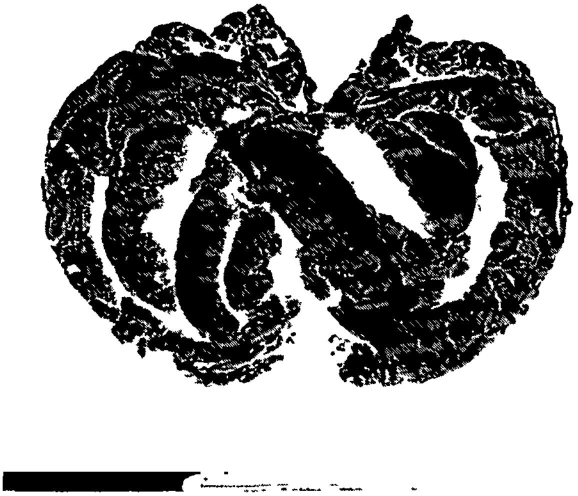

Fig. 3.—Bursal sac open with small arched bands in each hemisphere and one large arched band extending from one hemishpere to the other.

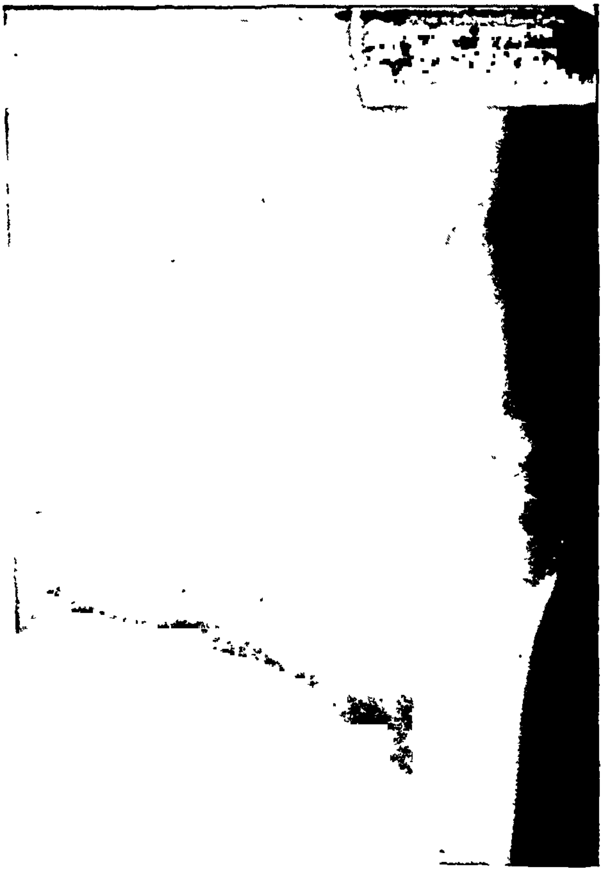

Fig. 2.—Roentgenogram taken after ischialectomy.

Pathologic Picture: The gross specimen consisted of a roughly spherical mass 8 cm. in diameter. Its color was gray to tan. Its consistency was firm and in parts rubbery and cartilaginous. The open sac seemed to contain a mass of small intestine (Fig. 3). An arched band 1.8 cm. in diameter extended from one hemisphere to the other. Three smaller bands were present in each hemisphere. Three papilloma-like growths, the largest of which was 1 cm. high, were visualized. The wall of the bursal sac reached a maximal thickness of 2 cm. The specimen weighed 161.5 Gm.

Microscopically, sections of the cyst floor revealed chronic fibrovascular granulation tissue. There was moderate infiltration by polymorphonuclear leukocytes. A section through one of the papilloma-like masses revealed well vascularized fibrovascular granulation tissue with foci of deposition of yellowish-brown pigment and occasionally areas lightly infiltrated by plasma cells, eosinophils and lymphocytes. A section through one of the intestine-like bands revealed well organized granulation tissue with prominent bundles of fibrous tissue and occasional small areas of fibroblastic proliferation and giant cell formation.

The bizarre structures encountered in the bursal sac consisted of granulation tissue with areas of necrosis and acute inflammatory infiltration.

COMMENT

Ischialectomy has become the method of choice at this center in the treatment of recurrent ischial decubitus ulcers Twelve ischialectomies have been performed to date[1] It is too early to compare the end results of this method with the number of cures achieved by a less radical procedure[1] A comparison will be published when a comparable number of ischialectomies have been performed The soft tissue closure in the ischialectomy follows our primary method[1]

SUMMARY

An ischial decubitus ulcer with an atypical bursal sac is described, the contents of which simulated loops of small bowel Closure by radical ischialectomy is described The gross and microscopic appearance of the specimen is described The clinical importance of this extensive procedure is briefly discussed

SUMARIO

Se ha descrito un caso de ulcera isquiatica por decubito complicada por una bolsa serosa atipica cuyo contenido simulo segmentos intestinales El tratamiento consistio de una isquialectomia radical Tambien se ha descrito el examen patológico de dicho espécimen Finalmente, se ha discutido el valor clínico del procedimiento seguido en este caso

RÉSUMÉ

Description d'un ulcere de décubitus ischial avec un sac en forme de bourse, son contenu faisant croire à l'enroulement de l'intestin grêle On nous presente la fermeture par une ischialectomie radicale Description de l'aspect microscopique de ce specimen L'importance clinique de ce procedé mutilant est brievement discutee

RIASSUNTO

Descrive un caso di ulcera da decubito dell ischio, con una larga borsa a pareti atipiche il contenuto di questa borsa, illustrato macro— e microscopicamente, simulava delle anse del l'intestino tenue L A ha eseguito un'ischialectomia totale, discutendo l'importanza clinica di questa difficile operazione

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Editorials

Physical Signs in Clinical Surgery

An Editorial Book Review

WHAT would happen to the modern clinical surgeon if he were suddenly deprived of his elaborate modern diagnostic equipment? It is hard to say; but it is safe to assume that, if he found himself still in possession of an indelible lead pencil, a magnifying glass, a couple of tape measures (linen and metal), an electric pocket flashlight, a pair of dividers, a wooden tongue depressor (or a spoon), a clinical thermometer, a box of matches and a patella hammer, plus a copy (in good condition) of Hamilton Bailey's "Physical Signs in Clinical Surgery,"* he would not do too badly.

This unique and invaluable work, now enjoying the well-deserved distinction of an eleventh edition, is as impressive as ever for solid common sense and even more impressive in format. To illuminate and substantiate his conviction that actual clinical experience and observation are the best grounds for clinical diagnosis, the author employs the best and most convincing of all proof—clear, actual and widely diversified photographs, many in color, of patients suffering from surgical disease. Even a layman, should he make close and careful study of this book, would emerge to some degree a diagnostician.

External discoloration, one of the most important physical signs of disease, is here plainly demonstrated in dozens of different aspects and in reproductions so accurate as to be startling. Mr. Bailey has not been satisfied with color photography, but has insisted on color photography brought to the peak of perfection. The localized paling of the skin, for example, in a case of tuberculosis of the knee, is clearly shown—no easy matter, photographically speaking. The gradations of color in a festering sore, the saffron skin associated with profound jaundice, the hideous green-black discoloration of gangrene—these are but a few of the color demonstrations which, in this book, are displayed as clearly as in the surgical ward or on the operating table. No condition in which discoloration plays a major rôle is without its colored illustration here.

Other conditions, in which the principal physical signs are abnormalities of posture, configuration and the like, are demonstrated by halftone photographs of equal perfection. Anatomic charts and line drawings are supplied when required, but by far the greater emphasis is placed on the photograph; in other words—and mark this well—*on the patient.* Not only Mr. Bailey's personal credo and his excellent text but his very illustrations, every one of them, thus emphasize a fact too often neglected—that the patient is paramount and that surgery exists to serve his need. Surgeons would do well to bear in mind the quotation that heads this book: "The wards are the greatest of all research laboratories."

These words, spoken by Sir Henry Wade in 1932, suggest an anxiety for the increasing dehumanization of surgical science. Has the tendency gained or lost ground since the words were spoken? Evidence can doubtless be adduced on both sides. Surgeons and specialists, who occupy the peculiar position of being the only jurors who are competent to pass judgment on themselves, might profit from a little self-searching here.

We tend to forget what issues lie in our hands. It is easy to forget them nowadays, with the patient and his woes half hidden from our sight in a jungle of instruments, records and hospital red tape. These things cannot be avoided in modern life, but the modern intelligence must take account of them. They must not be allowed to obscure the main purpose of surgery. The old-fashioned surgeon, who met and conquered a hundred handicaps an hour by sheer force of his own ingenuity, had neither our opportunities nor our temptations, he could not forget his patient in his art, for his art depended almost totally on his knowledge of the patient and the evidence of his own senses The ability to be guided by such evidence is not to be despised, and we are in danger of losing it if we lose sight of its essential and permanent importance

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*Physical Signs in Clinical Surgery. By Hamilton Bailey. Baltimore. The Williams and Wilkins Co., 1949. 11th ed.

There is great encouragement, then in the appearance of an eleventh edition of a work based wholly on this enduring concept If there were not among us thousands who face this fact Hamilton Bailey's book could not have won and retained its immense popularity Nowadays both common sense and common humanity sometimes seem to the most optimistic among us to have reached a level so low as to invite despair, but despair is far from us while such books as this are written

M T

Surgical Lectures, Old and New

An interesting little treatise on the surgical lectures of a hundred and fifty years ago has recently come to hand* At that time, the author comments with a discernible touch of nostalgia, it was possible to cover practically the entire field of surgery in a set course of lectures Surgery has grown, and this is not possible now Nevertheless one must agree that the spoken word still has certain advantages over the written one The easy, colloquial, conversational style of a good lecturer acts with immediacy upon the collective mind of the audience in a way that the most profound writing may fail to do

Such masters of the lecturing art as Abernethy, John Hunter, Pott and Astley Cooper make interesting reading even today Hunter s style is remarkable for its clearness being almost reminiscent of a good teacher instructing children On referred pain, for example, he observed

> A diseased part may sympathize with a diseased part or a sound part with a diseased part

and on immunity,

> the body, once affected by some stimuli, never forgets and thereby is never again affected by that poison

Abernethy's style was quite different from Hunter's but no less effective He was dramatic rather than pedagogic, and sprinkled his lectures liberally with illustrative anecdotes from his own experience Cooper was a pupil of Hunter, as Hunter had been a pupil of Pott, in both instances the pupil surpassed his master as a wielder of the spoken word Cooper s lectures are still quite widely read for they combine most of the elements that distinguished those of the other lecturers of the period—good pedagogy, good histrionics and sound scientific knowledge

The lecture still has its place, of course, in surgery, but the field has widened so immensely that no single lecture and no single course of lectures can be simply a lecture on surgery It must deal today with one or two facets at most of that many faceted science Still it is possible to infuse the lecture with the old vitality, and many famous surgeons are still able to achieve it On the other hand there are many to whom the lecture is only a duty, to be got through with credit but without enjoyment on the lecturer's part and therefore, we greatly fear, without much of either enjoyment or profit on the part of the audience An opportunity to lecture is an opportunity to grow, no man can teach others (if he puts his heart into it) and not learn something himself Moreover, a genuine rapport between speaker and audience is one of the most delightful things in the world There is nothing quite like it for solid satisfaction Those old masters of surgery must have glowed with pleasure to see faces light up in response to a shared experience a new idea or a witty and telling thrust in controversy Why should we be deprived of this charming by product of our years of labor? We must specialize, true, but still we can speak our minds We can still light candles of thought in the minds of others, and attract to ourselves the light that is in them as well

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*Surgical Lectures of 150 Years Ago By V Zachary Cope Proc Roy Soc Med 41 353 1948

New Horizons

By the Editor

Health Conditions in Israel

The first 1949 volume of the *Hebrew Medical Journal,* which initiates its twenty-second year of publication, contains a number of highly interesting articles on health conditions in Israel today. These articles appear in the form of a symposium. Among the most important factual articles are "Errors and Faults in Diagnosis and Treatment of Infectious Diseases in Israel," by Dr. Moshe' Fischel; "Clinical Forms of Tuberculosis Among the Jews in Israel," by Dr. Rudolf Levy and "Public Dental Health in Israel," by Max Laufer, D.D.S. Dr. Fischel's presentation concerns itself chiefly with malaria, typhus and dysentery, the most prevalent infectious diseases in Israel, with emphasis on their different courses as compared with observations in the Western Hemisphere. Dr. Levy's article is also comparative, discussing tuberculosis among the Jews in Israel as it varies in incidence and nature from tuberculosis in other countries. Dr. Laufer's report on dental health is highly encouraging, announcing as it does the remarkable advances already made in this field.

For the collector of scientific curiosa and historical items, a section headed "Old Hebrew Medical Manuscripts" presents a unique article entitle "Poison, Charm and Love Potions Among Jews and Other Peoples," by Dr. Z. Munntner. In the *Personalia* section, Dr. Z. J. Plashkes of Tel Aviv comments interestingly on the first native Palestinian physicians, who were pioneers of medical progress in what is now Israel.

To the *Hebrew Medical Journal* and to its editor, Dr. Moses Einhorn, the *Journal* extends hearty congratulations on twenty-one years of service and on the fine issue beginning the twenty-second. The fortunes of Israel, late-born and promising nation among the nations of the world, are of the greatest interest to thinkers everywhere. There is no better sign of progress in any locality than the growth and maintenance of intelligent interest in health and medical advancement. This sign being plainly evident in Israel, we may look forward to further important developments in the near future and to an increasing solidarity and awareness of Israel's significance in the community of nations.

Opportunity for Service

The tragic plight of the Navajo Indians in Arizona and New Mexico, although somewhat alleviated since the general uprising of public opinion a few years ago, is by no means rectified as yet. Especially as regards medical and nursing care, hospital facilities and education in hygiene and sanitation, a great deal remains to be done. The Federal Government is active in the matter. "There is money available now for nurses and doctors," says Norman M. Littell, General Counsel for the Navajo Indians, "but there will presently be very substantial sums available for the development of hospital facilities on or near the reservation in Arizona or New Mexico. . . . A Navajo-Hopi rehabilitation bill has passed both Houses of Congress, and after several adjustments by the House and Senate will soon become the law. Of approximately $80,000,000 provided in this bill, approximately $4,750,000 is for these hospitals and hospital expansion during the next ten years." This is excellent news, but without sufficient professional personnel of a sufficiently high type it can come to nothing so far as results are concerned. The shortage of both doctors and nurses in the hospitals now existing is desperate. At the Fort Defiance Hospital, to give one example, thirty-five beds are unused and useless, and all members of the staff are so harassed by the pressure of work that administrative problems cannot be met satisfactorily Similar conditions exist in practically all of the hospitals now available to the Navajos

The health, safety and civic usefulness of some 63,000 Indians is at stake Where could a young physician or surgeon begin his career to greater advantage, as regards both experience and human values? Where could a nurse be better employed than here? What doctor or nurse, perplexed and troubled perhaps by the need of removing some member of the family to a drier climate, can find a better way of solving the problem and at the same time building a worth-while career in the service of others?

The Navajos are a strong, intelligent race, lacking only education and the discipline it brings to become extremely valuable citizens of our country Mr Littell gives it as his opinion that there is ample talent among them to fill all staff positions except those requiring the highest training This possibility is not being overlooked and it is planned eventually to establish a training school for Navajo nurses and other hospital personnel Education, however, takes time, especially when the most meagre facilities are lacking, and in the meanwhile these people must be cared for Surely it is not consonant with the dignity of our country or with the democratic ideal that any segment of our population, especially such a large one, should be neglected in matters as fundamental as health

Posts available on the reservation are open to qualified citizen doctors and nurses under Civil Service regulations A trained nurse receives a salary of $2975 per year The salary range for doctors is from $5,000 to $6 000 The opportunity for experience and service is unparalleled, offering a challenge high enough to satisfy the most ardent There is great interest, as well as great enlightenment, in working with a special racial group The discoveries that await the earnest worker are not altogether medical

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Copies of the Revised Constitution and Bylaws
Are Now Ready for Distribution

All who are interested in membership qualifications should write to the

Secretary, International College of Surgeons

1516 Lake Shore Drive Chicago, Ill

News Notes

British-American Exchange Fellowships in Cancer Research

The American Cancer Society, in conjunction with the British Empire Cancer Campaign, is offering British-American exchange fellowships in cancer research. Specialized training is provided for American investigators to study in Great Britain where there are opportunities that are not generally available in this country. An equal number of British scientists will be selected for training in the United States. The candidate must have qualifications to carry on the proposed study and applications may be submitted at any time to the Executive Secretary of the Committee on Growth, Division of Medical Sciences, National Research Council, 2101 Constitution Avenue, Washington 25, D. C.

New Cancer Grants

Grants totaling $3,250,000 for assistance in construction of cancer research facilities have been announced by the Federal Security Agency. The University of Minnesota, the University of Chicago, the New England Deaconess, the University of Kansas, Johns Hopkins University, St. Louis University, New York Memorial, the University of California, and the University of Pennsylvania have all received a share in this gigantic program.

The American Heart Association's New Journal

In order to permit the printing of 25 per cent more material in each issue, The American Heart Association will publish, beginning January 1950, a new official journal known as "Circulation—The Journal of the American Heart Association." A new and larger format will characterize the Journal and all phases of scientific heart information for specialist, clinician, and investigator will be included.

Checklist Holdings of German Medical and Dental Periodicals

The Committee on Periodicals and Serial Publications of the Medical Library Association has compiled an Interim Checklist of Holdings of 168 German Medical and Dental Periodicals (1939-1948) in 38 libraries of the United States and Canada.

Remittance of $1.00 to Mrs. Edith Dernehl, Marquette University Medical Library, 561 N. 15th St., Milwaukee 3, Wis., will assure the sender of a copy.

National Cancer Hospital of America Ready Soon

The National Cancer Hospital of America is scheduled for opening in Detroit late in 1951, with a large share of the building funds already obtained through gifts. The hospital will be nonsectarian and national in scope.

Pediatric Congress

The Sixth International Congress of Paediatrics will be held in Zurich, Switzerland, during the last ten days of July 1950. Further information may be had from the secretary-general, Prof. Emmett Holt, Bellevue Hospital, New York 16, N. Y., or the president of the congress, Prof. G. Fanconi, Kinderspital, Zurich.

Funds Available for Research on Lymphatic Leukemia

A fund of $25,000 from the estate of Charles R. Blakely for the support of research in the field of lymphatic leukemia has been made available through the National Research Council. Application forms and information may be obtained from the Chairman, Division of Medical Sciences, National Research Council, 21 Constitution Avenue, N. W., Washington 25, D. C.

American Alumni of British Medical Schools Incorporate

In order to serve more effectively the interests of its members, the American Alumni of British Medical Schools, organized in 1940, obtained incorporation recently under the laws of the State of New York. Doctors who took their degrees from medical schools of the British Commonwealth of Nations or the Irish Free State may join the organization by writing to Dr. Theodore Maltzer, secretary, 123 East 37th Street, New York 16, New York.

Eye Bank Established

The recent Congress of the Ophthalmological Society of the United Kingdom has created an eye bank for the purpose of accumulating and distributing corneal grafts. The resources will not be limited to corneal grafting, but will include items useful in the plastic repair for severe injuries of the lids and orbits, lacrimal obstructions, paralysis of extra-ocular muscles, new forms of enucleation with implantation and the application of modern prostheses.

New Books

A Short Practice of Surgery By Hamilton Bailey and R J McNeill Love Baltimore The Williams and Wilkins Company, 1949 8th ed Pp 1050, 1198 illustrations, including 280 color plates

That a new edition of this highly valued textbook was in demand barely two years after the appearance of the last is evidence enough of its vital importance in the world of surgery The authors have recognized and met the need for an absolutely up to date presentation and have even, after this short interval, found occasion to add one completely new chapter dealing with peptic ulcer Other important changes and additions have been made

The most striking alteration perhaps, is the enrichment of pictorial content Surgeons everywhere are familiar with Mr Bailey's wonderful achievements in color photography and will find in these pages new reason for admiration The accuracy of reproduction in color, even of the most difficult conditions to photograph, is almost beyond belief

The general coverage of this work is too familiar to require description, but it is obvious even at a glance that no effort has been spared by the authors to improve what was already excellent and to elucidate modern technics with meticulous care Too often a new edition of a successful work is done on the "once over lightly" principle, but in this instance it can be seen clearly that the authors have no inclination to rest upon their laurels

The Sexual Criminal By J Paul de River Springfield, Ill , Charles C Thomas, 1949 Pp 281, illustrated

An excellent short treatment of crime resulting from sexual abnormalities and aberrations, this book will be welcomed by physicians the legal profession, and all students of abnormal psychology Such perversions as sadism, masochism, bestiality, necrophilia, fetichism, etc , are described and clarified by case reports from the author's own experience The appalling fate of the sexual criminal's victim is unforgettably emphasized by unaltered photographs taken immediately after discovery of the crime

Dr de River explores the apparent contradictions in the sexually psychotic personality, including as evidence several pages of poetry written by a sado masochist He also explores the significance of dreams, the use of "truth serum" in criminal investigation the psychology of the female sadistic criminal, homosexual sadism and masochism and the so called lust murder The problems confronting the medicolegal expert in court are enumerated and helpfully commented upon

The special value of a work of this kind lies in the fact that it is written from the standpoint of the individual personality rather than from that of the psychosis in general It is therefore a convenient handbook for the general practitioner who has not time to cope with the usual massive textbook on psychiatry

The Development of Gynecological Surgery and Instruments By James V Ricci Philadelphia The Blakiston Company, 1949 Pp 594, illustrated

An unusual and valuable book for the medical researcher, this history of gynecology from the dawn of recorded history well repays the reader for his time There are many striking illustrations depicting instruments and devices used in gynecologic practice many centuries ago some of them surprisingly ingenious in construction and all of them highly interesting

That Dr Ricci found the exploration a fascinating one is evident from the vigor and energy of his writing "In medicine,' he remarks, 'ideas once formulated may seem to die out, only to quicken in subsequent, more receptive generations A search for these original ideas has led to original sources, with the accompanying excitement and enjoyment of ferreting out priority Since it is difficult, if not impossible to convey the colorful and sometimes quaint phraseology of the old authors it is hoped that the reader will be lured back to the sources " He is quite likely to be for these studies are not only interesting, they are stimulating as well

There is always room in the library for sound historical contributions to the medical literature Not only does such a book as Dr Ricci's provide interesting and provocative material for reading and study, but it helps to maintain the professional sense of continuity with the past, an element in the philosophy of healing that we cannot afford to neglect

Abraham Levinson Anniversary Volume Edited by Solomon R Kagan New York Froben Press, Inc , 1949 Pp 365, illustrated

In recognition of his services to medical science as physician teacher author and researcher, this volume has been presented to Dr Levinson by his colleagues in honor of his sixtieth birthday It is a fitting tribute to a distinguished man and a great pediatrician.

Dr. Levinson's portrait appears as the frontispiece, and a brief biographical sketch is included, together with a personal tribute in the form of a prefatory letter from Dr. Isaac A. Abt. The bulk of the volume, however, consists of scientific and literary contributions from Dr. Levinson's friends and admirers. There are four main divisions: *Pediatric Neurology and Psychiatry, Blood and Cerebrospinal Fluid, General Pediatrics* and *Medical History.* The last-mentioned division is a delight to the general as well as to the professional reader.

Blood and Plasma Transfusions. By Max M. Strumia and John J. McGraw. Philadelphia: F. A. Davis Company, 1949. Pp. 497; 124 illustrations.

The importance of transfusion has increased steadily since the day it was first successfully performed. As the authors of this treatise truly remark, "it has become almost a specialty." They approach the problem from a dual standpoint, the clinical and the technical, pointing out that a clinician and a laboratory man must work closely together for good results.

The book should meet a real demand, for it is both detailed and comprehensive. Not only the technical and therapeutic aspects but the practical management of blood and plasma services are discussed, with definite suggestions as to record-keeping and other matters of routine. There are many well-organized tables of pertinent data. Charts, graphs, line drawings and photographs are inserted where indicated, with appropriate comments by the authors.

Clinical Neurology. By Bernard J. Alpers. Philadelphia: F. A. Davis Company, 1949. Pp. 846; 240 illustrations.

The many experiences of World War II in the field of neurology and neurosurgery, especially with regard to peripheral nerve injuries and cranial trauma, have brought out information without which no modern textbook on neurology is complete. Dr. Alpers has therefore revised and enlarged his already successful text, including these wartime data and also bringing up to date his discussion of meningitis, syphilis of the nervous system, epilepsy and poliomyelitis.

Like the original work, this new edition is based on the needs of the student and the general practitioner. It achieves a remarkable clearness and simplicity, considering the complex subject matter. Chapter 2, "Interpretation of Neurological Symptoms and Signs," is outstanding. A valuable feature is provided by the admirably organized "tables of differential diagnosis" with which the book is implemented throughout. These too have been carefully brought up to date.

Clinical Interpretation of Laboratory Tests. By Raymond H. Goodale. Philadelphia: F. A. Davis Company, 1949. Pp. 605; 107 illustrations.

Here is a systematic presentation of laboratory tests and technics useful in the diagnosis and treatment of all varieties of pathologic disturbance. Opening with a discussion of normal physiologic values and the significance of various departures therefrom, Dr. Goodale proceeds to describe various clinical and surgical entities and the physiologic abnormalities associated with them, clarifying the problem of diagnosis with many excellent charts and tables in addition to the textual content. Antibiotics and chemotherapy in general are thoroughly treated under the heading "Bacteriologic Examinations." In the section on hematology, the effects of the atom bomb, which somewhat resemble those of overexposure to roentgen rays, are given mention.

Dr. Goodale warns the reader that "although certain tests are pathognomonic, clinicians should not rely entirely upon the laboratory for a diagnosis," since these, although often extremely helpful, "cannot replace a careful history and physical examination."

An Atlas of Amputations. By Donald B. Slocum. St. Louis: The C. V. Mosby Company, 1949. Pp. 562: 564 illustrations.

Factors of practical significance in amputation are the basis of Dr. Slocum's book, whose purpose is "to present to the reader those methods of the past which have stood the test of time and to add to these the fruits of recent experience in surgery, rehabilitation and prosthetics." The main point of emphasis throughout is function, since the author rightly declares that an amputation is not terminated with the closure of the surgical wound but imposes upon the surgeon a responsibility to see that the artificial member is properly selected and fitted and the patient rehabilitated to normal life as far as possible.

There are four main divisions of the material: "Orientation," "Surgical Considerations," "Surgical Techniques" and "Convalescent Period." All are generously illustrated. The final section especially is notable for its encouraging photographs of amputees engaging in nearly all popular sports, such as swimming, diving, golf, bicycling, baseball and tennis. The immense improvement in amputation technics and facilities during the past few years, as emphasized by the recent war, is nowhere better or more vividly presented than in these pages.

Abstracts from Current Literature

Acute Abdominal Emergencies Thorek, P, J Mich State Med Soc 48 189, 1949

The following outstanding acute surgical abdominal conditions have been observed in a series of surgical cases obtained from Cook County Hospital, Chicago (1) perforated peptic ulcer (2) acute appendicitis, (3) acute cholecystitis (4) renal colic (5) acute hemorrhagic pancreatitis and (6) coronary occlusion These cases cover a ten year period Dr Thorek points out that although a coronary occlusion is not a surgical emergency, its correct diagnosis is of surgical importance Another disease that should not be forgotten is acute salpingitis

After a thorough probing of the six aforementioned conditions the author points out that many other acute abdominal conditions at times require differentiation Some of these are strangulated hernia, regional ileitis, mesenteric lymphadenitis mesenteric thrombosis vasitis torsion of the omentum, volvulus and intussusception However missing one of the rather unusual conditions in this latter group is considered more readily explainable than missing the symptoms of the primary six

A H Letton

Urethral Caruncle Palmer J K Emmett, J L and McDonald, J R, Surg, Gynec & Obst 87 611, 1948

The authors present an extensive review of the literature concerning the etiology, pathology classification and treatment of urethral caruncle Because of the diversity of opinion upon this subject the conclusion is drawn that there is no definitely known cause and no single treatment of the condition

The review is excellent Certain significant facts are brought out namely, that urethral caruncle is a benign condition of the female urethra that may or may not cause symptoms Treatment has been both conservative (topical application of caustics or radium and roentgen therapy) and radical The latter consists of simple fulguration simple excision or removal by electrosurgical knife, loop or urethraplasty A combination of conservative and radical methods has also been used

The authors also reviewed 120 cases from the Mayo Clinic, presenting a complete histopathologic and chemical study It was concluded that regional or circumscribed urethral mucosal prolapse is probably the cause of urethral caruncle which can explain the varied symptoms, that the anatomic and histologic structure of the female urethra encourages this type of prolapse and that the varying degrees of trauma and irritation that may occur give rise to a varied microscopic picture

Urethral caruncle is not a neoplasm or a precancerous lesion but these conditions may coexist and every caruncle should be examined microscopically to determine its benign or malignant character All methods of treatment described have a place in the therapy of caruncle but should be considered only palliative as the rate of recurrence is high and further treatment may be necessary

David Gomberg

Carcinoma Developing in Chronic Draining Cutaneous Sinuses and Fistulas McAnally, A K, and Dockerty, M G, Surg, Gynec & Obst 88 87 1949

The carcinogenic 'tendencies of radiodermatitis, senile keratosis leukoplakia and other lesions have been stressed for many years This has led to early diagnosis of carcinoma superimposed upon these lesions, with an excellent prognosis for those treated at an early stage The literature covering the occurrence of carcinoma in chronic inflammatory sinuses and infected tissues is reviewed

The clinical material for this paper was obtained from cases observed at the Mayo Clinic in which malignant changes had taken place in chronic sinuses fistulas cutaneous lesions and chronic osteomyelitic sinuses There were 9 cases of osteomyelitic sinuses in approximately 4 000 cases (0 23 per cent) There were 3 cases in 3 000 of fistula in ano (0 1 per cent) There was 1 empyemic sinus out of 1,500 cases (0 07 per cent) There were 11 men and 2 women The maximum duration of this sinal inflammation was forty eight years two years was the minimum, with an average of twenty six and seven tenths years There were 6 lesions in the tibia and 1 each in the femur, shoulder, hand and pleural space Three were fistulae in ano

The signs and symptoms were gone into in each one of these 13 patients In 7 of the 9 nodes were involved, and in 2 more they became invaded later after the lesion was first diagnosed Syphilis was found in 1 case and pathologic fracture in 2

In the osteomyelitic group all the lesions were squamous cell epitheliomas most of them low grade by Broders method In the fistula in ano group 1 was a squamous cell epithelioma and 2 were adenocarcinomas All 3 were Grade 1 lesions In the empyemic group 1 was a Grade 2 [illegible]thelioma

Of the osteomyelitic [illegible] 3 h [illegible]itations and 1 of these had p [illegible] rapy

One of these 3 patients lived eleven years and died of gastric carcinoma. Another was alive twenty-one years after the operation, and a third died of chronic nephritis fourteen years postoperatively. One patient died from metastatic lesions three years after a partial amputation. One patient died one year after the operation; the cause of death is not stated. The other patients were alive from four to thirteen years after amputation. One patient could not be traced.

Of the patients with fistula in ano, 2 died within a year after their operations, and the third was living and well three years after excision of this tract. The 1 patient with empyema was lost sight of when he left the hospital two weeks after the operation.

In the author's opinion, too much emphasis has been placed on Cohnheim's theory of chronic irritation as the causative factor in malignant change. They emphasize the low incidence of this complication in the many cases of chronic osteomyelitic sinuses and other draining sinuses studied for many years. These sinuses should be completely excised, or complete or partial amputation should be done as soon as the diagnosis is made. It is proposed that regional lymph nodes should be treated with roentgen therapy, and in some cases a prophylactic dissection of these nodes should be considered. For fistula in ano and empyemic sinus, radical excision is advocated.

E. L. Jewett

Epinephrine and Histamine in Obliterative Inflammations of Arteries. (O Adrenalinie i Histaminie w Zwezajacych Zapaleniach Tetnic). Nowicki, S., Polski Przeglad Chirurgiczny **21**:21, 1949.

Clinical observation points to the fact that administration of histamine is not constant in inducing an increase in epinephrine secretion. In physiologic states it produces dilatation of arterioles and capillaries. Adrenalin does not affect all vessels to the same degree; some, particularly those in the muscles, it dilates. Vascular contraction may occur also with a low content of epinephrine in the blood. The epinephrine level is not constant; consequently its action cannot result in the well known contraction complex.

The action of histamine on the secretion of epinephrine in cases of obliterative vascular disease is not known. Histamine in the colon, observed in the presence of chronic constipation, does not seem to increase the epinephrine content of the blood. In man, small amounts of histamine given hypodermically dilate the arterioles and capillaries of the extremities. Clinical observation shows that injection of small quantities (3 to 5 mg.) of histamine in many instances of obliterative inflammation of the arteries will increase the circulation, and more frequent doses may improve the circulation of the extremity. This may be confirmed by the skin temperature curve of the foot.

W. F. Kalisz

Chronic Nonspecific Jejunitis. Green, R. B., Navy Med. Bull. 49:488, 1949.

A review of the literature on chronic enteritis indicates that chronic nonspecific jejunitis occurs with only 5 per cent of the frequency of regional ileitis. Three cases of proved chronic nonspecific jejunitis were studied by the author. On the basis of the data obtained by these studies and that supplied by other authors, he outlines some of the characteristics of this disease.

It is predominantly a disease of young men, although any age group may be affected. The average age of the patients in reported cases is 29½ years. No cases are cited in the literature in which the patients were women. The cause is unknown. Many theories have been presented but none proved. The pathologic picture varies with the duration of the disease. In the early stages the affected jejunum appears hyperemic, dusky and thickened. Varying degrees of lymphadenopathy may be seen in the ajacent mesenteric lymph nodes. All or any portion of the jejunum may be involved. In the late stages obstruction, obliteration of the intestinal lumen or fistula formation may occur.

A history of gradually increasing abdominal pain, nausea, vomiting, diarrhea, lassitude, loss of weight and a low grade fever lasting from one week to several months is often obtained. The pain is usually intermittent and cramping; it is located frequently in the epigastrium, although it may occur in the lower abdominal quadrants. Roentgen examination often shows hypermotility and loss of the "herring-bone" pattern in the region of the jejunum in cases without obstruction. A delay in the passage of barium from the duodenum is noted if obstruction exists in the jejunum. In late stages the "string sign" of Kantor may be evident.

The treatment is surgical. Resection of the diseased segment of jejunum with primary anastomosis, and also duodenojejunostomy after transection of the jejunum below the involved portion, are methods of treatment that have been employed. The author resorted to gastroenterostomy in his 3 cases. All of these methods have apparently given good results.

Follow-up studies have shown the patients whose cases are reported in this paper to be symptom free since operation. It is felt, however, that they may not be cured and that the disease may occur in other segments of bowel. J. O. Morgan

Cough Fracture of Ribs Raymond C Cohen, Brit Med J 1 133, 1949

This paper calls attention to an infrequent fracture that occurs as a result of coughing Many of the patients are tuberculous and the fracture probably occurs after violent expiratory effort as in coughing or sneezing Women seem to be much more frequently affected than men

The literature on this topic is scanty, the first mention of the condition being attributed to Halliwell in 1929 The author presents 7 cases, in all of which the patients had tuberculosis In no case was there any trauma or injury The upper four or five ribs are the ones least likely to be fractured because they have less excursion than the others and are supported by more of the scapular musculature

Primary tuberculous osteitis of the ribs is extremely uncommon and is probably not the basic cause of many of these fractures However, it is possible that the bone becomes rarefied when it is adjacent to a cold abscess arising from a caseous tuberculous gland Old age with its increased osseous fragility, is a definite contributing factor

Blood calcium and blood phosphorous levels remain constant in patients with pulmonary tuberculosis and hence cannot be a causative factor

The author expresses the opinion that the most likely mechanism producing this condition is violent and abnormal action of the chest probably associated with asymmetric posture exerting uneven action on the ribs occurring during the violent expiratory effort of a cough or a sneeze

E L Jewett

New Incisions and Revised Technics in Peripheral Nerve Surgery Seletz, E, Western J Surg Obst & Gynec 56 565, 1948

As the result of studying and repairing 2 037 nerve injuries while in Army service the author realized that for a successful outcome the following four principles had to be observed 1 A more direct surgical approach to obtain adequate exposure 2 Avoidance of injury to other structures 3 Bridging of extensive gaps 4 Prevention of contraction scars

The approach to deep lying nerves is made through fascial planes rather than by penetration through muscles If a muscle is to be cut it must be split in the direction of its fibers When a muscle must be divided it is severed only at its point of fascial attachment Cutaneous incisions perpendicular to flexion creases result in a traction scar

Five incisions are described (1) cubital approach to the median nerve by a Z incision (2) popliteal approach to the sciatic nerve at its point of division, (3) lateral approach to the sciatic nerve in the thigh, (4) mesial approach to the tibial nerve, and (5) combined incision of the hand and the wrist for following the median or ulnar narves The small intact area between the two incisions consisting of skin, fascia, and transverse carpal ligament is undermined and the nerve exposed beneath it

R \ Cooper

Cystadenoma of the Pancreas Herrman, C S, and Asbell, N, Am J Surg 78 107, 1949

The authors present 2 cases of cystadenoma of the pancreas in both of which the tumors were excised intact They state that the symptoms of this disease are those produced by pressure of the tumor on adjacent viscera, and hence subject to wide variation Methods of treatment are discussed, the authors expressing preference for total excision In their opinion these tumors are more common than is generally realized probably because individual surgeons hesitate to report on their necessarily meagre experience

Howard S Stern

Needle Biopsy of the Liver in the Diagnosis of Surgical Jaundice Webb, J P, and Werthammer, S, South Surg 15 393, 1949

Needle biopsies of the liver have been used in the study and diagnosis of various deseases of the biliary tract This means of investigation is especially helpful in arriving at the cause of jaundice when other methods have failed The structure of the liver is such that the material obtained by needle biopsy gives the pathologist sufficient tissue to get an adequate microscopic picture of the various components of the organ

The authors use a "Vim' Silverman needle, which is introduced in the midaxillary line at the center of liver dullness to a depth of 2 to 4 cm in the right lobe of the organ By this approach the danger of injury to hollow viscera and large vessels is obviated Hemorrhage is the greatest hazard although it is rarely severe enough to be serious Pain occurs in about one third of the patients and is usually referred to the right shoulder or to the neck

The histologic differentiation of extrahepatic block from hepatitis is based on microscopic details which are relatively simple except in late stages In cases of obstructive jaundice the ducts become enlarged and filled with inspissated bile and the hepatocellular element tends to be spared When complete obstruction persists for some time, atrophy of the liver cells occurs and bile ducts become compressed by inflammatory infiltration

Even in these cases the pathologic change is largely confined to the periportal field and does not invade the lobule until very late. In the presence of hepatitis there is diffuse infiltration of all components of the liver with inflammatory cells. Kinking and disruption of the liver cords is noted, associated with degeneration and necrosis of the cells, and the radial structure is blurred with exudate.

It is felt that extrahepatic obstruction can be diagnosed with certainty from biopsy studies within two or three weeks after the onset of jaundice. Occasionally, after this time, the condition may be hard to differentiate from longstanding hepatitis.

J. O. MORGAN

Vagotomy and the Anatomic Variations in the Vagus Nerve, Boyd, A. K., Am. J. Surg. 78:4, 1949.

Dr. Boyd has conducted an extremely detailed dissection of the vagus nerve in 50 preserved cadavers, from the bifurcation of the trachea to the incisuria of the stomach. His purpose was to determine whether or not the vagi between those levels could be separated into definite patterns (1) to determine a level at which the trunks might be fewest and most readily isolated for surgical division and (2) to discover what anatomic variations would make such a transection difficult.

The results were tabulated into six groups of patterns of increasing complexity. The greatest uniformity observed in the stomach. Only rarely did any trunk remain single for a distance of more than 5 cm., and there were anastomoses between the anterior and posterior trunks.

Classification of the pattern of the vagus innervation of the stomach at the esophageal hiatus (50 consecutive cadavers) showed 7 with single anterior and posterior trunks, 4 with 1 anterior and 2 posterior trunks, 13 with 2 anterior and 1 posterior trunks, 7 with 2 anterior and 2 posterior trunks, 10 with 3 or more anterior and 1 posterior trunks and 9 with 3 or more anterior and two or more posterior trunks.

The posterior gastric nerves were more constant than the anterior. The author concludes that vagotomy, which is technically feasible through the abdomen, can be totally accomplished only by stripping the esophagus and the upper part of the stomach of all obvious nerve trunks and adventitious tissues down to the longitudinal muscle layer for a distance of not less than 8 cm.

HOWARD S. STERN

Giant Follicular Lymphoblastoma of the Appendix. Jason, R. S., and Malloy, H. R., Am. J. Surg. 78:123, 1949.

The authors present a case of lymphoblastoma of the appendix, the tenth to be discussed. In this case the tumor was a nodular swelling in the middle of the appendix, but the lesion may be nodular, pedunculated or diffuse. It is important because the tumor may mimic appendicitis or appendicitis may complicate the tumor. Furthermore, it may become malignant.

The tumor is insidious in onset and may occur at any age. It is at first benign and may remain so and heal, or it may become malignant. The patient appears healthy during the benign phase and at this time the tumor is highly radiosensitive. The lymphoepithelial structures of the digestive system may be involved. Appendectomy while the lesion is localized apparently cures the disease.

HOWARD S. STERN

CORRECTION

Owing to an error in typesetting, a line was omitted from the Acknowledgements appended by Dr. Thomas J. Kirwin to his article "Tumors of the Bladder" in the January issue of the *Journal.* The first sentence of the Acknowledgements should have read as follows:

Dr James Lisa of the Doctors Hospital and New York City Hospital and Dr. Chandler Foot and Dr. John M. Pearce of the New York Cornell Medical Center supplied the pathologic studies presented here.

Armamentarium

Air Conditioning. Eleven new or completely redesigned air conditioning units for room, apartment, office or suite of offices are presented by Carrier Corporation of Syracuse, New York, as part of its 1950 line. The corporation announces that its distributors and dealers have also been provided with a liberalized retail financial program.

Rectal Irrigator: An instrument designed to eliminate the use of bed pans in the administration of enemas is offered by Woods Professional Supplies of South Gate, California. The device is said to reduce the number of necessary changes of hospital bed linen by eliminating the need of long drainage periods, to permit thorough irrigation and cleansing, and to obviate the need for absorbent cotton padding during drainage. There is no need for the nurse or attendant to lift the patient at any time during the process.

New Sulfonamide Preparation: Sharpe & Dohme of Philadelphia announce the national release of Neotresamide Tablets, a triple sulfonamide combination. The tablets are designed to eliminate the problem of crystalluria (formation of sulfonamide crystals in the urinary tract). They contain sulfamerazine, sulfamethazine and sulfadiazine in the following proportions: 0.1 Gm. sulfamerazine, 0.2 Gm. sulfamethazine and 0.2 Gm. sulfadiazine per 0.5 Gm. tablet.

Dial to Measure Heat Radiation: The Heat-O-Meter Company of New York has placed upon the market a new calculating dial for measuring heat radiation on steam and hot water heating systems. The manufacturer claims that it eliminates the tedious figuring usually necessary to determine the correct amount of radiation and can be used by anyone, without previous technical training. An additional feature of this instrument is that it contains sizes, capacities and minimum and maximum heights on both old and new styles of radiators, mains, returns, risers, chimneys, round and sectional boilers, etc., thus delivering the correct answers to heating problems at the turn of the dial.

New Penicillin Product: Winthrop-Stearns, Inc., is now offering Procaine Penicillin G in Oil with 2% Aluminum Monostearate, fortified with Potassium Penicillin G Crystalline. Each unit contains 400,000 units of penicillin per cubic centimeter and is packaged in vials of 10 cc., sufficient for 10 doses.

Tax Guide for Doctors: The Schering Corporation is issuing a new edition of its guide to preparation of the physician's income tax declaration and return, providing answers to everything from general tax return procedure to such problems as bad debts or the deductibility of reading matter for the physician's waiting room. The "Guide" is being presented to physicians by Schering Professional Service Representatives, as a further service to the medical profession.

New Tape Recorder: The A. E. Aldridge Associates of Philadelphia are introducing a tape recorder that, according to its originators and manufacturers, carries tape recording into a brand new phase of development. Its exclusive features include twin track recording without interruption for rewinding and a "Thread-a-Matic" feature that simplifies the threading of tape. The volume indicator, an electric eye device, is said to make perfect recording possible every time. Known as "the REEL-EST," the tape recorder has been made for easy portability and is carried in a streamlined case of simulated leather. The makers suggest that doctors will find it useful in recording laboratory observations, consultations and case histories, interns, in checking patients into the hospital and recording the condition of those already hospitalized.

Compact Autoclave: The "Presto Autoclave," a low-priced portable steam sterilizer for physicians, dentists and research laboratories, uses only plain water in its operation and, it is claimed, makes it possible to sterilize instruments, dressings, gloves, gowns, etc., in a few minutes' time at the lowest possible cost. The autoclave is streamlined for easy cleaning and constructed of aluminum for lightness in weight. It contains a stainless steel sterilizing crate (capacity 915 cubic inches). Only dry steam comes into contact with the contents of the sterilizing crate, which eliminates the possibility of contamination in handling for drying before use. This autoclave is distributed by its manufacturers, the National Pressure Cooker Company of Eau Claire, Wisconsin. It may be ordered either direct from the factory or through the company's representatives.

In Memoriam

GLENN HAROLD HEILMAN

M.D., F.A.C.S., F.I.C.S.

Dr. Glenn Harold Heilman, of Tarentum, Pa., passed away in September 1949. Dr. Heilman was a graduate of the Medical School of the University of Pittsburgh and did his postgraduate work at Harvard. His specialty was surgery, general and industrial. For nineteen years he served on the Senior Surgical Staff of Allegheny Valley Hospital at Tarentum. He was a member of the American Medical Association, the American College of Surgeons and the Allegheny County Medical Society.

NATHAN I. SLUTSKY

M.D., F.I.C.S.

On May 12, 1949, Dr. Nathan I. Slutsky, Brooklyn, N. Y., died at the age of 63. Dr. Slutsky, attending urologist at the Beth Moses Hospital, N. Y., received his medical education at Cornell medical school, and served his internship at the Sydenham hospital, N. Y. Dr. Slutsky was a member of the Society of County of Kings, and the Genito-Urinary Division of the County of Kings.

AUSTIN CHALMER LYNN

M.D., F.A.C.S., F.I.C.S.

December 27, 1949, marked the passing of Dr. Austin Chalmer Lynn of Philipsburg, Pa. Dr. Lynn was graduated from the Medico-Chirurgical College at Philadelphia in 1911. During the years 1917, 1918 and 1919 he served as a surgeon in Evacuation Hospital No. 3, American Expeditionary Force. From 1919 to 1946 he was a member of the surgical staff at Philipsburg State Hospital, serving from the year 1932 as Chief of Staff and Chief of Surgical Staff.

Dr. Lynn's active career was devoted entirely to general surgery. He was a member of the American Medical Associaton and a Life Member and Fellow of the American College of Surgeons. He held membership also in the Clearfield County and Pennsylvania State Medical Societies.

SAMUEL FREDERICK MULLINS

M.D., F.A.C.S., F.I.C.S.

Dr. Samuel Frederick Mullins, of Danbury, Conn., a graduate in 1906 of the University and Bellevue Hospital Medical College (now Medical College of New York University) died recently after thirty-seven years of service as Attending Surgeon and Consulting Surgeon at Danbury Hospital and Southbury Training School.

Dr. Mullins was a past president of the Danbury Medical Society and the Fairfield County Medical Association, and represented Fairfield County on the Connecticut State Council. He was a member of the American Medical Association, the American College of Surgeons, the New York Academy of Medicine, Danbury Medical Society and Connecticut State and County Medical Societies.

PAUL NEWTON JEPSON

M.D., F.A.C.S., F.I.C.S.

Dr. Paul Newton Jepson, of Philadelphia, died on Oct. 24, 1949. A graduate of the University of Pennsylvania Medical School, Dr. Jepson held responsible staff positions in orthopedic surgery at St. Joseph's Hospital, Doctors Hospital, Fitzgerald Mercy Hospital and Phoenixville Hospital and was Associate Professor of Orthopedic Surgery at the University. He has done notable investigative work on Volkmann's contracture and spastic birth palsy.

Dr. Jepson was a member of the American Medical Association, the American College of Surgeons, the American Academy of Orthopedic Surgeons, the Alumni Association of the Mayo Foundation and Pennsylvania State and County Medical Societies.

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Original Articles

Osteoid Osteoma: Etiology and Pathogenesis

Report of Twelve New Cases

BERNARD PINES, M D, F A C S, F I C S, LEROY LAVINE, M D,
AND DAVID M GRAYZEL, M D
BROOKLYN

IT IS the purpose of this paper to describe briefly the clinical, roentgenologic and pathologic features of 12 new cases of osteoid osteoma On the basis of this study and a review of the literature there will be discussed some of the controversial phases of this condition, namely its etiology and its pathogenesis

In 1935 Jaffe called attention to an osseous lesion previously described by some authors and classified by them as a disease of inflammatory origin Jaffe described the condition in detail; he noted that it appeared to follow a distinctive clinical, roentgenological and morphologic pattern It was his considered opinion that this was not an inflammatory lesion but a slow growing benign osteogenic tumor Predicating his suggestion upon this new concept of the pathogenesis of the condition as well as upon its morphologic configuration, he proposed the name "osteoid osteoma"

Soon after Jaffe's original report of 5 cases it was shown that the condition was unique but not rare Six additional cases came to his attention in 1936, and numerous reports of individual cases and small groups of cases were published by different authors In 1946 Sobel was able to collect 106 cases from the literature Approximately 150 cases have been reported to date, and by and large the concept of tumor has been accepted A small minority of authors, however, still relegate this condition (and in our opinion with reason) to the category of inflammatory disease This will be discussed in greater detail later in this paper Although the etiologic factors may as yet be conjectural, there appears to be no doubt that this disorder represents a distinct pathologic and clinical entity

CLINICAL FEATURES

Osteoid osteoma is an oval or round sharply circumscribed lesion of the bones measuring from a few millimeters up to 2 cm in diameter, it usually measures about 1 cm Almost invariably it is a single, isolated lesion, only 2 instances of dual lesions in one bone have been reported (Lapidus, Salem and Sherman) Histologically it consists of a substratum of vascular osteogenic connective tissue in which are seen variable quantities of calci

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From the Department of Laboratories of the Jewish Hospital of Brooklyn fied and uncalcified osteoid tissue, trabeculae of newly formed atypical bone, and numerous giant cells. It may be found in the spongiosa of a bone or in the cortex. In the latter area it may occupy the midcortex or its subperiosteal or endosteal surface. At times it abuts on the joint cartilage, and occasionally it erodes through it. Surrounding the osteoid nidus there is usually a considerable area of perifocal sclerosis, extending for variable distances beyond the lesion.

Osteoid osteoma has been reported as occurring in the bones of every part of the appendicular and axial skeleton except the ribs. It is probably only a matter of time before it will be observed in that area also. Willis, in his discussion of solitary osteomas of the skeleton, described a characteristic lesion in the temporal bone of the skull. He believed it to be a hamartoma. Benjamins also reported it as occurring in the nasal sinuses. Generally speaking, it has a special predilection for the bones of the legs. In more than half of the cases reported in the literature the lesion was located in the tibia or the femur; less frequently it was seen in the upper limbs. In the present series of cases the lesions were distributed as follows: tibia, 6; femur, 1; humerus, 2; spine, 2, and os calcis, 1.

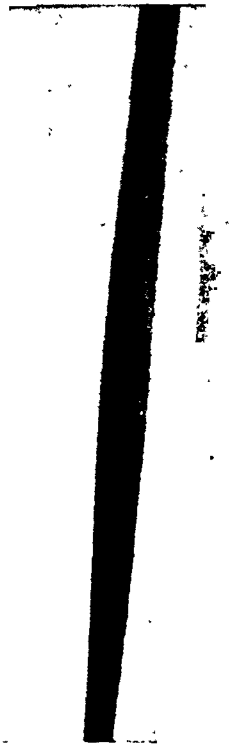

Fig. 1 (Case 1).—Roentgenogram showing an oval area of radiolucency occupying the cortex of the tibia, surrounded by sclerotic bone of increased density. The affected bone is thickened in this area as a consequence of periosteal new bone deposition.

This condition is predominantly a disease of adolescents and young adults between the ages of 10 and 25 years. Only occasionally is it encountered in persons beyond the third decade of life. The youngest patient whose case was reported in the literature was 14 months of age, the oldest 55 years. The average age in our own cases was 19.5 years; the oldest patient was 33 and the youngest 10. Generally speaking, the lesion predominates in the male in the approximate proportion of 2 to 1. In our series of cases there were 10 male and 2 female patients.

The chief complaint was invariably that of pain in the affected area. This varied greatly in both nature and intensity. It was described by different patients as sharp, dull, aching, boring, lancinating, burning, twitching, throbbing, drawing and digging. It was mild and intermittent at first; then it increased in persistence and severity. In some instances it was distinctly more severe at night and in damp weather. In most cases aspirin relieved the pain. Only 1 patient, in a case reported by Sobel, made no mention of spontaneous pain. In this instance attention was called to the condition by the appearance of torticollis and cervical discomfort on motion of the head. In 2 of our cases there was no history of spontaneous pain; in 1 (Case 5) the presenting complaint was that of a lump in the left leg. In another (Case 11) stiffness of the back and a change in gait preceded the onset of discomfort in the region of the lower dorsal and upper lumbar portions of the spine.

The most constant signs associated with osteoid osteoma were local swelling and tenderness. Frequently these were the only clinical symptoms. Swelling was especially evident when the muscles covering the affected bone were not too thick. When the lower limb was involved, limping was common. If the lesion occurred in or near a joint, one or more of the following signs were noted: swelling, stiffness, weakness, muscle spasm or atrophy, contracture deformities and limitation of motion. Local heat, red-

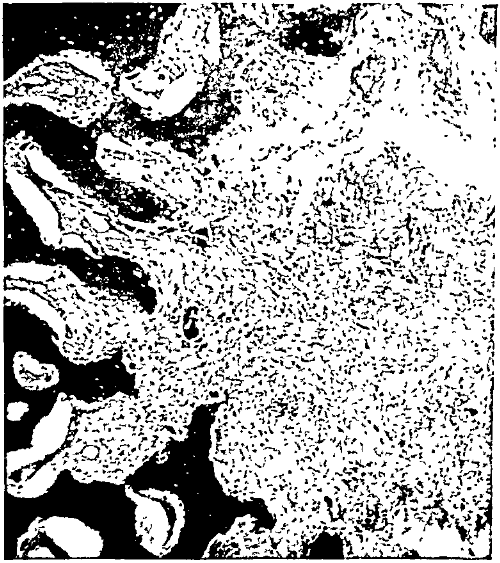

Fig. 2 (Case 1).—Photomicrograph (low magnification) showing a section through the entire lesion represented by the radiolucent area in the cortex of the tibia. Note the serration of the bone trabeculae which border the nidus and the osteoclasts in Howship's lacunae.

ness and hyperesthesia were uncommon. In 1 case there was bowing of the leg due to a lesion in the tibia (Ponsetti and Barta).

The duration of complaints at the time of admission to the hospital varied from a few months to some years. The average was six to twenty-four months. One of Jaffe's patients had symptoms for more than five years. Of the 24 patients in the cases described by Brown and Ghormley 11 had symptoms less than one year, and 8 noted symptoms from one to six years in duration. The remainder reported symptoms up to thirty-five years in duration. However, not all of the cases cited by Brown and Ghormley could be accepted as bona fide instances of osteoid osteoma, since morphologic evidence was lacking. In the present series of cases the average duration of symptoms was sixteen months; the shortest, two weeks and the longest, four years.

A history of trauma was elicited in 30 to 40 per cent of the reported cases. It was not regarded by most authors as either an etiologic or a precipitating factor; it was considered coincidental. Trauma antedated the onset of symptoms by weeks, months or years.

The most valuable diagnostic aid in the recognition of osteoid osteoma was roentgenographic study of the affected bone. Characteristically the nidus appeared as a small oval or round sharply circumscribed, radiolucent or, less frequently, radiopaque area. At times the nidus itself was enveloped by a thin radiolucent circle. This was in turn surrounded by an opaque zone of denser bone, which represented the sclerotic reaction of the bone adjacent to the lesion. The dense perinidal reaction was narrow or wide; when the nidus was located in the cortex the perifocal sclerosis extended several inches above and below the osteoma.

Roentgen study was not always conclusive. In most of the reported cases the first impression of the roentgenologist was that of chronic inflammatory disease, usually the sclerosing nonsuppurative osteomyelitis of Garré or intracortical bone abscess (Brodie). Occasionally the diagnosis was made of syphilitic osteitis or periostitis; more rarely, of sclerosing osteogenic sarcoma and Ewing's endothelial myeloma. In the present series of 12 cases, 4 of the lesions were considered by the roentgenologist to be suggestive of bone infection, 2 were said to be either bone infection or osteoid osteoma, 4 were called osteoid osteoma, 1 was considered "negative," and 1 was interpreted as Ewing's tumor or osteomyelitis.

The reason for this diagnostic difficulty is at least in part due to the variable morphologic nature of the lesion in its various phases of development. The present concept (Jaffe) is that in its initial stage osteoid osteoma appears as a radiopaque shadow, while in its fullest maturity it is radiolucent. In its incipiency, therefore, if the perifocal density about the lesion is only slight it stands out as a distinct opacity. If, however, the adjacent hyperostosis increases and acquires the same density as the nidus, differentiation of the two is not possible; the affected area then appears roentgenologically only as a diffuse opaque area. Obviously, the lesion must evolve further to be identifiable. It then stands out as a characteristic radiolucent shadow in a sclerotic field. Even at this stage the nidus may be obscured by the adjacent hyperostotic bone. This is true especially when the lesion is in the cortex. In such instances only a blurred radiopaque shadow was seen on the roentgen film in many of the reported cases. This was corrected in most cases when increased kilovoltage was used in conjunction with Coning down on the field. Overexposure of the film in different planes in most cases caused the porotic nidus to stand out in contrast to the surrounding bone. In certain localities, such as the vertebrae and in the articular areas of the long bones, roentgenographic demonstration of the lesion was particularly difficult.

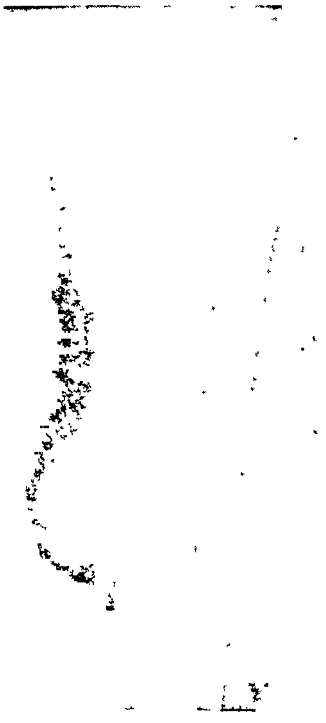

Fig. 3 (Case 2).—Roentgenogram showing an oval area of rarefaction on the surface of the cortex of the tibia, enveloped by a newly deposited layer of periosteal bone.

The cases of osteoid osteoma presented in this paper do not differ essentially in their clinical and roentgenographic manifestations from those previously described in the literature. In some of them, however, there were histomorphologic alterations not previously demonstrated. These are of fundamental importance in consideration of the nature of the lesion. The cases will be presented briefly, with stress on only such factors as are pertinent to the subsequent discussion of the etiologic and pathogenetic nature of this condition.

REPORT OF CASES

CASE 1.—S. A., a 13-year-old boy, was admitted to the Jewish Hospital complaining of pain in the right leg of two weeks' duration. It was severe and boring, coming on only at night. There was no history of trauma or infection.

Physical examination gave entirely negative results except for a small, tender elevation at the midshaft of the right tibia. The blood count showed 20,950 white blood cells per cubic millimeter of blood, of which 95 per cent were polymorphonuclear leukocytes and 5 per cent were lymphocytes.

On roentgen examination of the right leg there

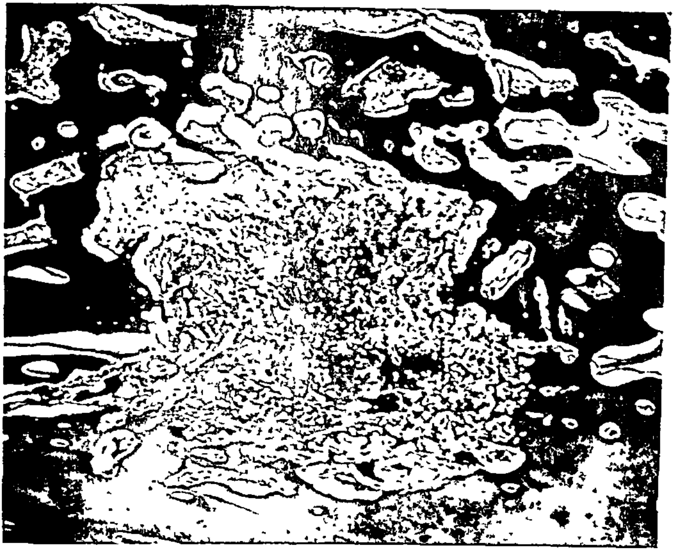

Fig 4 (Case 2) —Photomicrograph (low magnification) showing a cross section of the entire nidus sandwiched between the cortical lamellar bone and the outer periosteal new bone

was a localized area of periostitis and radiopacity on the anterolateral aspect of the midportion of the right tibia (Fig 1) In the center of the densified bone was an area of rarefaction The roentgenologist reported this as "not uncommonly found in low grade localized bone infection with secondary osteitis"

At operation, with the patient under general anesthesia, a segment of bone was removed which corresponded to the radiopaque area aforementioned, it measured 7 5 × 1 5 × 5 cm

Recovery was complete

Microscopic study of the excised segment of cortex showed it to consist of two dense layers of bone, which merged almost imperceptibly. The superficial or subperiosteal layer consisted of a hyperostotic zone of intercommunicating trabeculae of reticular bone These osteophytic trabeculae were largely arranged in parallel fashion, perdendicular to the surface of the bone In the medullary spaces there was delicate, vascular fibrous connective tissue marrow. The deeper layer of bone was composed of compact cortical lamellar bone and dense trabecular areas containing vascular connective tissue marrow. This was apparently the original cortex

A small, round, sharply demarcated area was seen in the deeper cortical bone (Fig 2). This was made up of a substratum of oval, fusiform, stellate and pyramidal cells that varied in size and shape and appeared to be connected by fibrillar processes The nuclei were round or oval Many large and small irregularly shaped multinucleated giant cells were noted In the interstices of this mesenchyme there was pink acidophilic substance, which appeared to enclose the osteoblastogenic cells Some amorphous calcium was seen in the masses of osteoid tissue The surfaces of the trabeculae of cortical lamellar bone bordering this nidus were serrated, and numerous osteoclasts were seen in Howship's lacunae Other surfaces of the trabeculae were lined with osteoblastic seams. These morphologic changes appeared to suggest that a process of lacunar resorption was widening the oval osteoid area, with a peripheral osteoblastic compensatory reactive process tending to limit its spread.

Case 2 —M. S , a 33 year-old man, was admitted to the Jewish Hospital complaining of dull local-

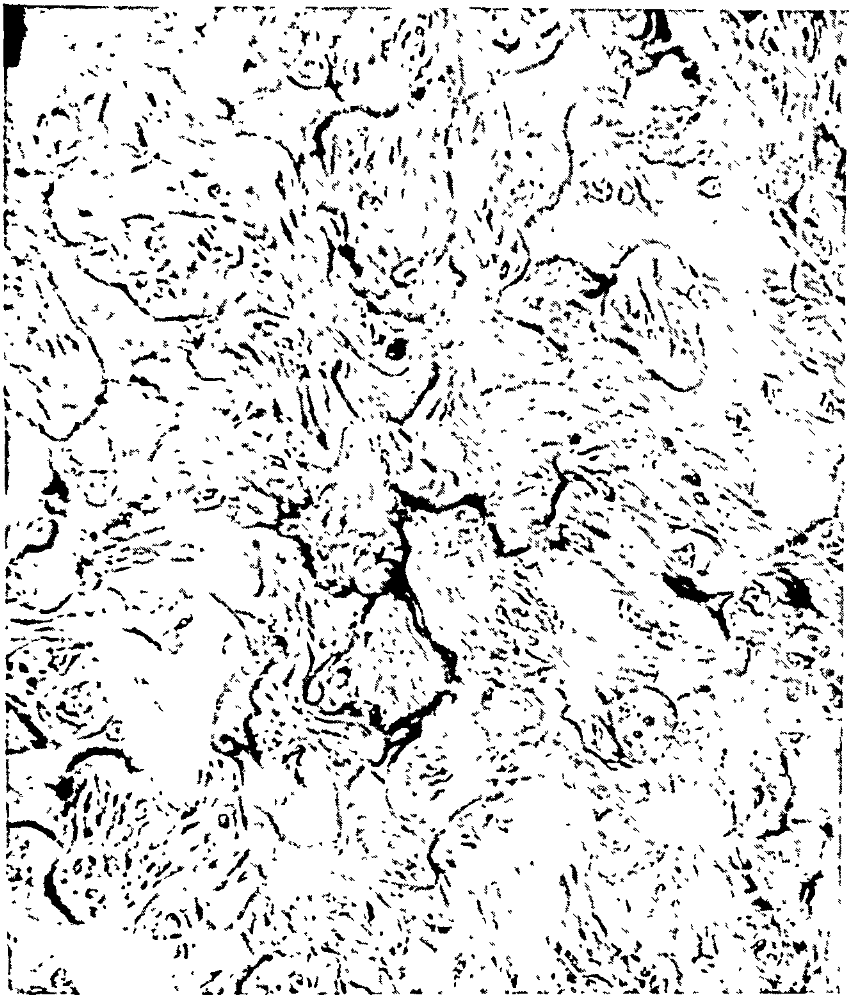

Fig. 5 (Case 2).—Photomicrograph (high magnification) showing osteoblastogenic matrix, occasional giant cells and interconnecting calcifying osteoid trabeculae.

ized pain in the upper third of the medial aspect of the left tibia, of one year's duration. This had become gradually worse and more frequent. About five months before admission a small swelling was noted in the affected area. There was no history of trauma or infection.

On examination the patient showed no positive general abnormalities. Locally a tender mass 4 cm. long was palpated on the upper third of the tibia. The blood count revealed 12,200 white blood cells per cubic millimeter of blood, with 77 per cent polymorphonuclear leukocytes.

Roentgenographic examination of the mesial aspect of the upper part of the tibia showed an area of productive periostitis with an oval area of rarefaction in to the cortex, which was considered by the roentgenologist to be suggestive of superficial infection (Fig. 3).

At operation, with the patient under general anesthesia, the entire block of affected tissue was removed. Bone graft chips were put into the resultant cavity, and the wound was closed. A plaster of paris cast was then applied. Recovery was complete.

Microscopic examination of the bone showed it to consist of a wide area of dense bone, in the center of which there was an irregular, oval, sharply circumscribed and relatively porotic area (Fig. 4). On closer inspection the latter was seen to be sandwiched between the surface of the true cortex and the adjacent reactive layer of hyperostotic osteophytic bone. This was verified by the presence of interrupted external circumferential lamellae and cement lines at the base of the lesion. The dense superficial layer of periosteal new bone consisted of large interconnecting trabeculae of quiescent, primitive bone trabeculae with medullary spaces containing connective tissue marrow. Traversing this layer were large blood vessels running from the periosteum to the original cortex The latter layer consisted of compact cortical lamellar bone Near the oval lesion the cortex showed con*centric and eccentric bone resorption* The spaces thus produced contained delicate connective tissue and osteoblasts The surface of the bone adjacent to the nidus was serrated and covered in places with seams of osteoblasts Bordering the osteoma there appeared to be direct continuity in places between the lamellar cortical bone and the calcified osteoid and reticular bone trabeculae within the oval area

The circumscribed lesion (Fig 5) was similar to that described in Case 1 It consisted of an osteo*blastogenic matrix and giant cells in which there* was osteoid tissue in various stages of calcification as well as early ossification On the periphery of the oval area there were seen lying free in the matrix, some partially resolved lamellar trabeculae apparently inclusions from the adjacent cortex A small area of periosteum was seen in which the blood vessels were numerous large and thick walled Occasional foci of round cell infiltration with a scattering of plasma cells and histiocytes were noted *in the periosteum adjacent to the bone* (Fig 6)

CASE 3—B S, a 26 year old man, was admitted to the Jewish Hospital with the complaint of pain in the upper outer aspect of the left leg of three years' duration Four years before admission the patient was treated for cellulitis in the same area This cleared up completely after two weeks of treatment During the following year the patient was hospitalized for a furuncular infection of the nose It was at this time that pains were noted in the *outer aspect of the left leg in its upper third* Roentgen examination at that time gave negative results *The next year the pains were more severe* and were described as "digging" Roentgen study again gave negative results The pain persisted and at the time of the present admission it was extremely severe

General physical examination revealed no abnormality Locally there was only a circumscribed area of tenderness about 2 inches (5 cm) below the knee The white cell count per cubic millimeter

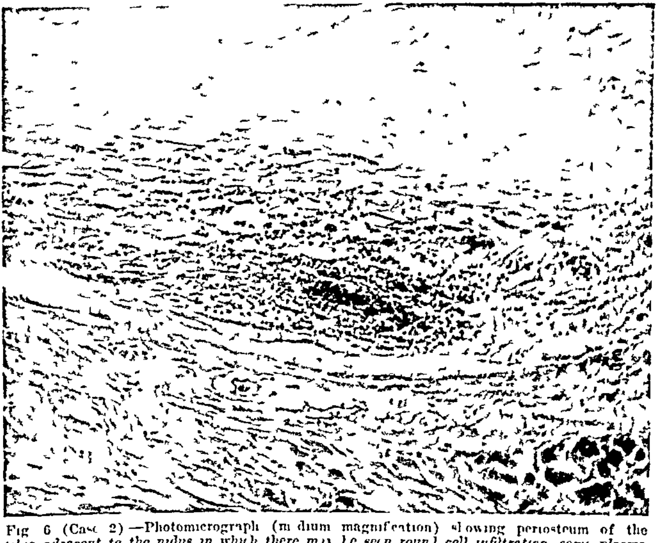

Fig 6 (Case 2)—Photomicrograph (medium magnification) showing periosteum of the tibia adjacent to the *nidus in which there may be seen round cell infiltration*, some plasma cells and histiocytes and thick walled blood vessels

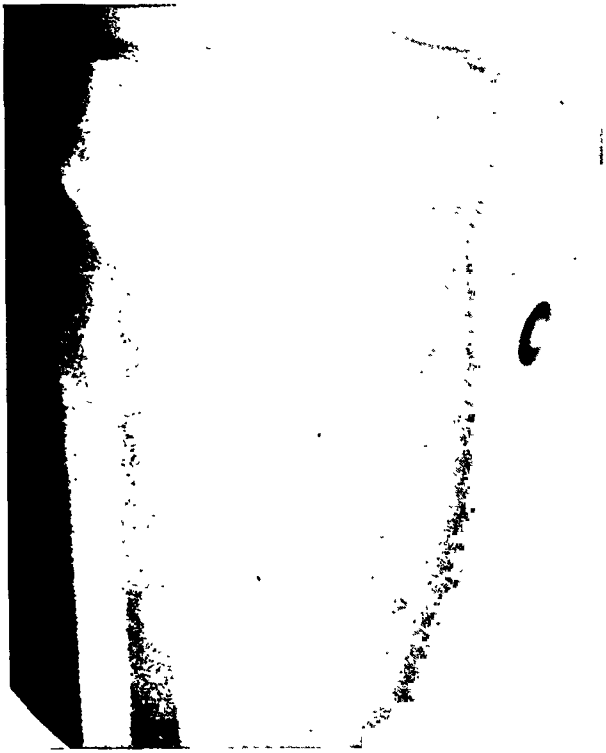

Fig. 7 (Case 3).—Roentgenogram showing an oval radiolucent shadow about 2 cm. in diameter in the upper third of the tibia surrounded by an irregular relatively radio-opaque zone.

of blood was 8,850; the differential count showed 85 per cent polymorphonuclear leukocytes and 15 per cent lymphocytes. Roentgen study showed a diffuse irregular radiopaque area on the lateral aspect of the tibia below the tuberosity. In it an oval radiolucent shadow measuring about 2 cm. was noted. The impression was that of chronic osteomyelitis or osteoid osteoma (Fig. 7).

At operation a large section of bone was removed by motor saw and osteotome. Recovery was uneventful, and the symptoms completely vanished.

Microscopic study of the removed bone showed it to consist of a layer of densely trabeculated lamellar bone which appeared to be the original cortex and a wider layer of dense lamellar osteophytic bone on its outer surface. The medullary spaces contained edematous connective tissue marrow. Between these two bone layers there was a circumscribed oval area 2 cm. in diameter and composed of a substratum of osteoblastogenic misenchyme with numerous osteoclasts and osteoid tissue (Fig. 8). In the center of the oval area there was a solid mass of osteoid tissue which on the periphery took trabecular form. Encircling this was a narrow ring of densely calcified osteoid tissue. On the outer surface there was a wide zone of interconnecting trabeculae composed of calcified osteoid and primitive bone. In some areas there appeared to be continuity between the nidal tissue and the adjacent lamellar bone trabeculae. The mesenchymal substratum of the osteoma merged with a layer of loose connective tissue which separated the osteoid from the surrounding cortical bone. In this connective tissue many small vascular elements and wide veins were seen. In places there was a predominance of delicate reticular connective tissue in which there was seen an interstitial infiltration of round cells and histiocytes; this was suggestive of granulation tissue (Fig. 9).

Case 4.—N. P., a 10-year-old girl, was admitted to the Jewish Hospital complaining of severe pain on the medial aspect of the right tibia, of ten months' duration. The pain was intermittent, recurring at intervals of several weeks and being particularly severe at night. The child was inclined to sit apart rather than run and play. About four months before admission a small mass was first noted in the region described as painful. There was no history of trauma.

General physical examination gave negative results. On the medial aspect of the right tibia, about 3 cm. below the tibial tubercle, there was a swelling measuring 4.5 cm. in length. This was not movable, but it was tender. The blood count and urine examinations revealed no abnormality. The sedimentation rate was 50 mm/hr. Roentgen examination of the affected area showed a densely sclerotic process involving the upper third of the tibia from a point just below the epiphysial line to a point slightly beneath the midportion of the tibia. The cortex was thickened, and a slight elevation of the periosteum could be demonstrated in the posterior aspect of the bone. A small radiolucent area was seen in the anterolateral aspect of the thickened focus (Fig. 10). The roentgenologist diagnosed it as chronic inflammatory disease. He could not, however, rule out osteoid osteoma.

At operation the periosteum was thickened; it was easily elevated from the bone. A sclerotic section of bone measuring 5 × 2 cm. was removed. In the medullary cavity there was seen an oval area about 2 cm. in length which was pink, granular and suggestive of a nidus; this was removed. The postoperative course was uneventful, and the patient remained free from symptoms.

Microscopic study of the removed sclerotic section of bone showed it to consist of dense lamellar compacta. A section of the nidus removed from the medullary cavity revealed hyperostotic lamellar spongiosa and edematous connective tissue marrow. Within the spongy bone there was a circumscribed mass of partially calcified osteoid tissue lying in a well-defined matrix of embryonal osteo-

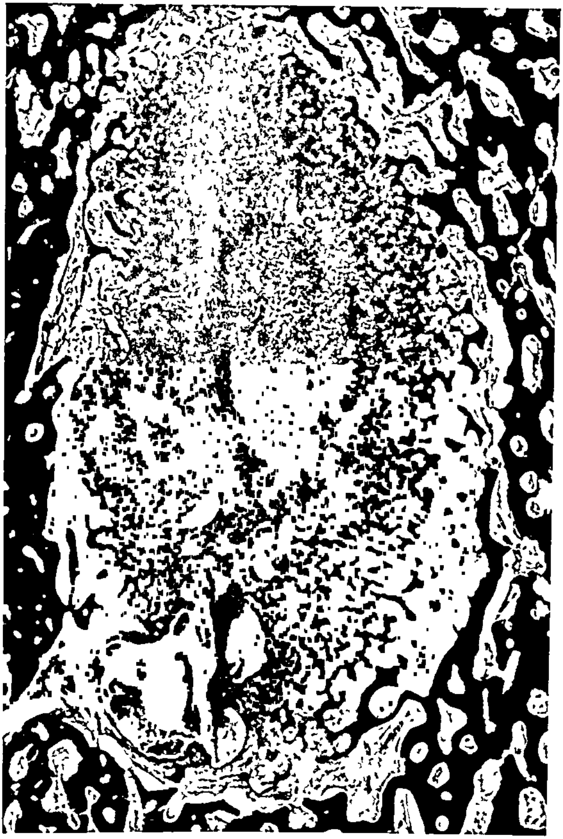

Fig 8 (Case 3)—Photomicrograph (low magnification) showing oval nidus surrounded by hyperostotic, sclerotic bone

genic connective tissue Numerous osteoclasts were noted (Fig. 11).

The attached periosteum consisted of dense fibroelastic connective tissue and contained many blood vessels. Numerous foci of perivascular round cell and plasma cell infiltration were seen; in these foci there were also scattered polymorphonuclear leukocytes and some endothelial cells (Fig. 12).

Case 5.—G. R., a 23-year-old man, was admitted to the Jewish Hospital complaining of a "lump" on the left leg of twenty-two months' duration. He had tripped and struck his leg against a hand truck one month before he noted the onset of the lump. The mass gradually increased in size, but it occasioned no symptoms.

Physical examination gave negative results ex-

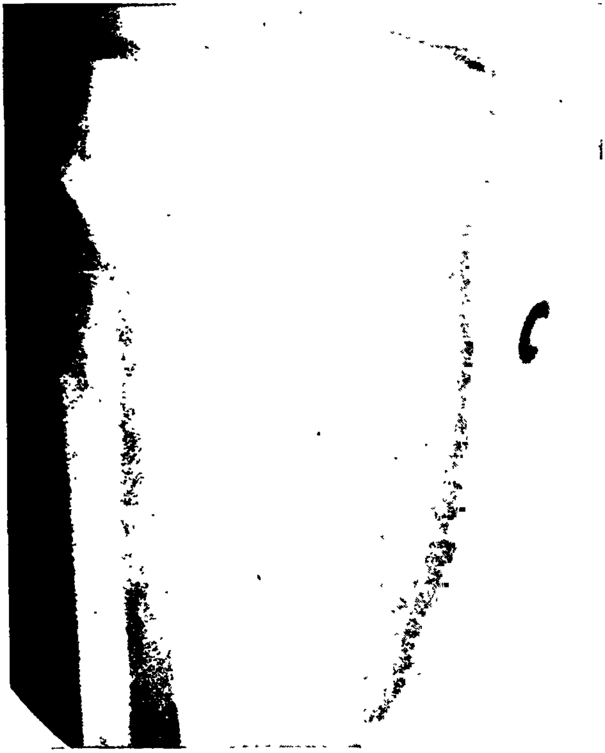

Fig. 7 (Case 3).—Roentgenogram showing an oval radiolucent shadow about 2 cm. in diameter in the upper third of the tibia surrounded by an irregular relatively radio-opaque zone.

of blood was 8,850; the differential count showed 85 per cent polymorphonuclear leukocytes and 15 per cent lymphocytes. Roentgen study showed a diffuse irregular radiopaque area on the lateral aspect of the tibia below the tuberosity. In it an oval radiolucent shadow measuring about 2 cm. was noted. The impression was that of chronic osteomyelitis or osteoid osteoma (Fig. 7).

At operation a large section of bone was removed by motor saw and osteotome. Recovery was uneventful, and the symptoms completely vanished.

Microscopic study of the removed bone showed it to consist of a layer of densely trabeculated lamellar bone which appeared to be the original cortex and a wider layer of dense lamellar osteophytic bone on its outer surface. The medullary spaces contained edematous connective tissue marrow. Between these two bone layers there was a circumscribed oval area 2 cm. in diameter and composed of a substratum of osteoblastogenic misenchyme with numerous osteoclasts and osteoid tissue (Fig. 8). In the center of the oval area there was a solid mass of osteoid tissue which on the periphery took trabecular form. Encircling this was a narrow ring of densely calcified osteoid tissue. On the outer surface there was a wide zone of interconnecting trabeculae composed of calcified osteoid and primitive bone. In some areas there appeared to be continuity between the nidal tissue and the adjacent lamellar bone trabeculae. The mesenchymal substratum of the osteoma merged with a layer of loose connective tissue which separated the osteoid from the surrounding cortical bone. In this connective tissue many small vascular elements and wide veins were seen. In places there was a predominance of delicate reticular connective tissue in which there was seen an interstitial infiltration of round cells and histiocytes; this was suggestive of granulation tissue (Fig. 9).

Case 4.—N. P., a 10-year-old girl, was admitted to the Jewish Hospital complaining of severe pain on the medial aspect of the right tibia, of ten months' duration. The pain was intermittent, recurring at intervals of several weeks and being particularly severe at night. The child was inclined to sit apart rather than run and play. About four months before admission a small mass was first noted in the region described as painful. There was no history of trauma.

General physical examination gave negative results. On the medial aspect of the right tibia, about 3 cm. below the tibial tubercle, there was a swelling measuring 4.5 cm. in length. This was not movable, but it was tender. The blood count and urine examinations revealed no abnormality. The sedimentation rate was 50 mm/hr. Roentgen examination of the affected area showed a densely sclerotic process involving the upper third of the tibia from a point just below the epiphysial line to a point slightly beneath the midportion of the tibia. The cortex was thickened, and a slight elevation of the periosteum could be demonstrated in the posterior aspect of the bone. A small radiolucent area was seen in the anterolateral aspect of the thickened focus (Fig. 10). The roentgenologist diagnosed it as chronic inflammatory disease. He could not, however, rule out osteoid osteoma.

At operation the periosteum was thickened; it was easily elevated from the bone. A sclerotic section of bone measuring 5 × 2 cm. was removed. In the medullary cavity there was seen an oval area about 2 cm. in length which was pink, granular and suggestive of a nidus; this was removed. The postoperative course was uneventful, and the patient remained free from symptoms.

Microscopic study of the removed sclerotic section of bone showed it to consist of dense lamellar compacta. A section of the nidus removed from the medullary cavity revealed hyperostotic lamellar spongiosa and edematous connective tissue marrow. Within the spongy bone there was a circumscribed mass of partially calcified osteoid tissue lying in a well-defined matrix of embryonal osteo-to the Jewish Hospital with the chief complaint of pain and swelling of the left leg of one year's duration. The swelling remained unchanged, but the pain was becoming progressively worse; it was sharp and lancinating. The past and family histories were not unusual. There was no history of trauma or infection.

Physical examination revealed no general changes. On the anterior aspect of the left leg there was a rounded mass which appeared to be associated with the underlying tibia. This was tender to pressure. The results of chemical blood tests and of the blood Wassermann test were negative. Study of the peripheral blood showed leukocytosis (21,800 white cells per cubic millimeter). The differential count revealed 82 per cent polymorphonuclear leukocytes.

With the patient under general anesthesia, a segment of dense bone was removed from the middle portion of the tibia. Roentgen examination of the segment revealed the central radiolucent oval area that had been noted in the preoperative tibial roentgenogram.

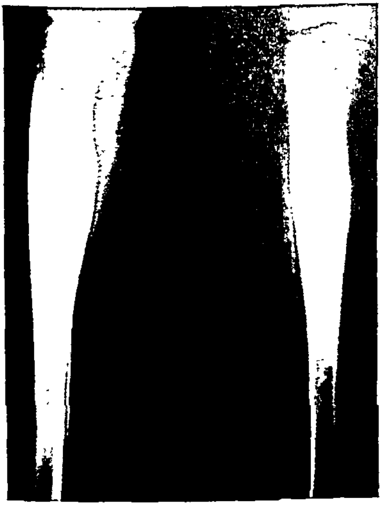

Fig. 10 (Case 4).—Roentgenogram of the tibia showing some widening of the bone and a marked increase in density of the upper third of the bone. A small radiolucent area is present on the anterolateral aspect of the bone where the periosteum is elevated.

Microscopic study of the bone segment excised from the tibia showed it to consist predominantly of mature, cortical lamellar bone covered by a narrow layer of fibrous periosteal connective tissue. In places bands of this connective tissue, accompanied by large-calibered vessels, dipped into wide Volkman's canals. Many of the haversian canals were wide and contained delicate vascular connective tissue. Towards the endosteal side of the cortex there was a sharply circumscribed porotic area. In the haversian canals adjacent to the rarefied zone there were large-calibered, thick-walled blood vessels. The bone was less dense in this area, and the medullary spaces were wider. The oval area consisted of a substratum of vascular osteogenic connective tissue in which were seen osteoid tissue and primitive and lamellar bone (Fig. 15). Osteoblasts arranged themselves in a continuous single chain on the surfaces of some of the trabeculae. Many inactive osteoclasts were also seen. In the center of the lesion there was an irregular mass of homogeneous pink, partially trabeculated and calcified osteoid tissue. Adjacent to this were numerous smaller groups of interrupted trabeculae of calcified osteoid tissue and primitive bone. There were also seen on the periphery of the lesion some islands of lamellar bone. The cortical bone adjoining the osteoma ended abruptly and the borders of the trabeculae facing the tumor were sharply serrated, indicating a past period of active lacunar resorption.

Case 7.—M. H., a 22-year-old man, was admitted to the hospital complaining of pain in the left knee, of six months' duration. At first it was sharp, brief and worse at night. It did not interfere with his activity. One month before admission it became more pronounced, and it was aggravated on motion. Some swelling of the knee was then noted. There was no history of trauma.

On physical examination only the local findings were noteworthy. There was swelling of the left knee. No tenderness was found. Flexion was normal. Extension was limited to 170 degrees; it was painful past 150 degrees. The clinical impression was that of osteochondritis dissecans.

Roentgen examination was made before admission of the patient to the hospital. The plates were not available for this study.

With the patient under general anesthesia, the knee joint was opened and a loose, vascular fragment of bone, described clinically as a sequestrum, was removed from the outer aspect of the medial femoral condyle. The underlying area of softening was curetted. It was thought to be a case of osteochondritis. Adjacent to the lesion an area of articular cartilage about 2.5 cm. long was replaced by connective tissue. A plaster cast was applied

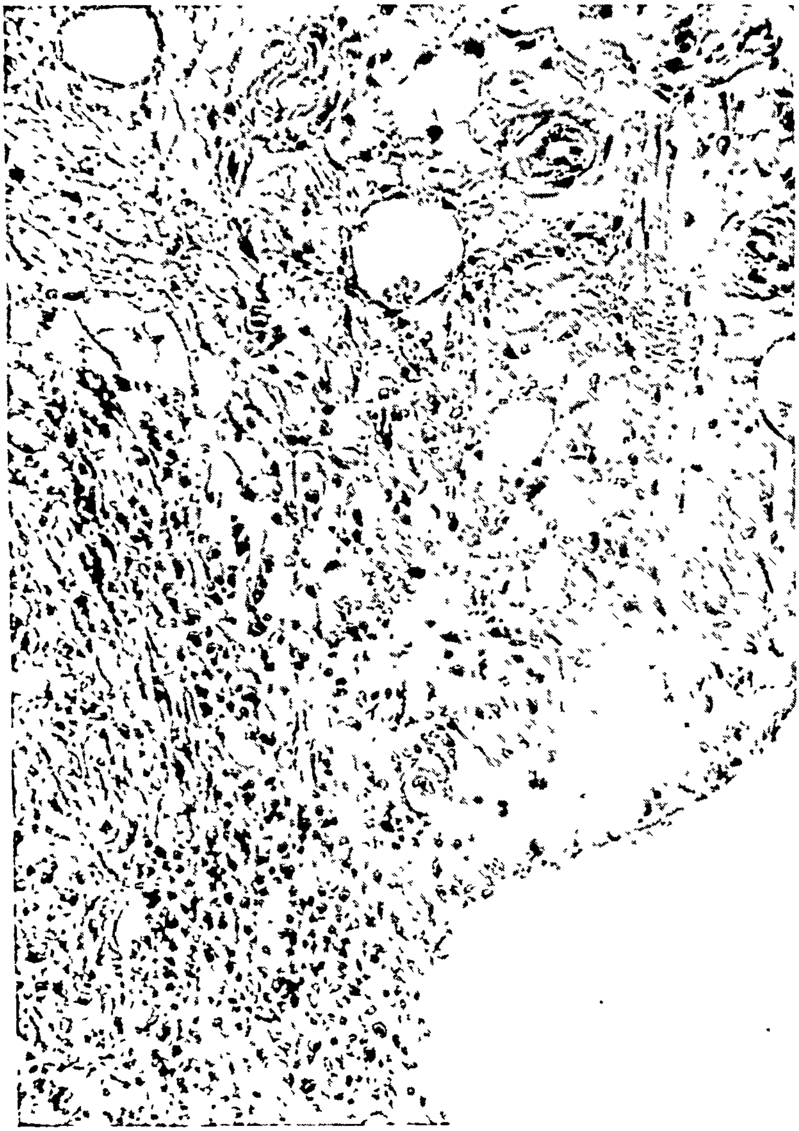

Fig. 9 (Case 3).—Photomicrograph (high magnification) from one corner of the lesion adjacent to the wide veins seen in Fig. 8. Note the delicate vascular connective tissue and the infiltration of round cells and a few histiocytes.

cept for a nontender elevation measuring 3 × 5 cm. on the medial aspect of the left tibia. The blood count showed 11,000 white cells per cubic millimeter, with 62 per cent polymorphonuclear leukocytes. Roentgenographic study of the left tibia revealed an oval rarefied area measuring 0.8 cm. in diameter in a zone of perifocal sclerosis (Fig. 13).

With the patient under general anesthesia, a wide segment of bone measuring 6 × 4 × 2 cm. was removed. The periosteum was described as thick and indurated. The tibia was saucerized and a medullary trough was established. The wound was closed and a cast applied. Recovery was uneventful.

Microscopic study of the bone showed it to consist of densely trabecular and compact cortical lamellar bone. In the trabecular areas there were fat marrow and edematous connective tissue. At one point there was a sharply circumscribed oval area composed of a matrix of osteoblastogenic mesenchyme and multinucleate giant cells in which there were trabeculated masses of osteoid tissue in various stages of calcification (Fig. 14). In some areas the matrix appeared to be more fibrillar and contained numerous small vascular channels and an infiltration of small round cells.

CASE 6.—G. R., a 13-year-old boy, was admitted to the Jewish Hospital with the chief complaint of pain and swelling of the left leg of one year's duration The swelling remained unchanged but the pain was becoming progressively worse it was sharp and lancinating The past and family histories were not unusual There was no history of trauma or infection

Physical examination revealed no general changes On the anterior aspect of the left leg there was a rounded mass which appeared to be associated with the underlying tibia This was tender to pressure The results of chemical blood tests and of the blood Wassermann test were negative Study of the peripheral blood showed leukocytosis (21,800 white cells per cubic millimeter) The differential count revealed 82 per cent polymorphonuclear leukocytes

With the patient under general anesthesia a segment of dense bone was removed from the middle portion of the tibia Roentgen examination of the segment revealed the central radiolucent oval area that had been noted in the preoperative tibial roentgenogram

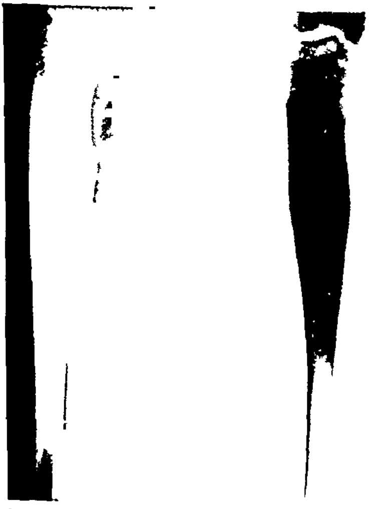

Fig 10 (Case 4) —Roentgenogram of the tibia showing some widening of the bone and a marked increase in density of the upper third of the bone A small radiolucent area is present on the anterolateral aspect of the bone where the periosteum is elevated

Microscopic study of the bone segment excised from the tibia showed it to consist predominantly of mature, cortical lamellar bone covered by a narrow layer of fibrous periosteal connective tissue In places bands of this connective tissue, accompanied by large-calibered vessels, dipped into wide Volkmann's canals Many of the haversian canals were wide and contained delicate vascular connective tissue Towards the endosteal side of the cortex there was a sharply circumscribed porotic area In the haversian canals adjacent to the rarefied zone there were large calibered, thick walled blood vessels The bone was less dense in this area and the medullary spaces were wider The oval area consisted of a substratum of vascular osteogenic connective tissue in which were seen osteoid tissue and primitive and lamellar bone (Fig 15) Osteoblasts arranged themselves in a continuous single chain on the surfaces of some of the trabeculae Many inactive osteoclasts were also seen In the center of the lesion there was an irregular mass of homogeneous pink, partially trabeculated and calcified osteoid tissue Adjacent to this were numerous smaller groups of interrupted trabeculae of calcified osteoid tissue and primitive bone There were also seen on the periphery of the lesion some islands of lamellar bone The cortical bone adjoining the osteoma ended abruptly and the borders of the trabeculae facing the tumor were sharply serrated indicating a past period of active lacunar resorption

Case 7 —M H a 22 year old man, was admitted to the hospital complaining of pain in the left knee, of six months' duration At first it was sharp, brief and worse at night It did not interfere with his activity One month before admission it became more pronounced and it was aggravated on motion Some swelling of the knee was then noted There was no history of trauma

On physical examination only the local findings were noteworthy There was swelling of the left knee No tenderness was found Flexion was normal Extension was limited to 170 degrees, it was painful past 150 degrees The clinical impression was that of osteochondritis dissecans

Roentgen examination was made before admission of the patient to the hospital The plates were not available for this study

With the patient under general anesthesia the knee joint was opened and a loose, vascular fragment of bone described clinically as a [illegible] was removed from the outer aspect of the [illegible] femoral condyle The underlying area of [illegible] was curetted It was thought to be [illegible] chondritis Adjacent to the lesion [illegible] ticular cartilage about 2.5 cm [illegible] by connective tissue A pl[illegible]

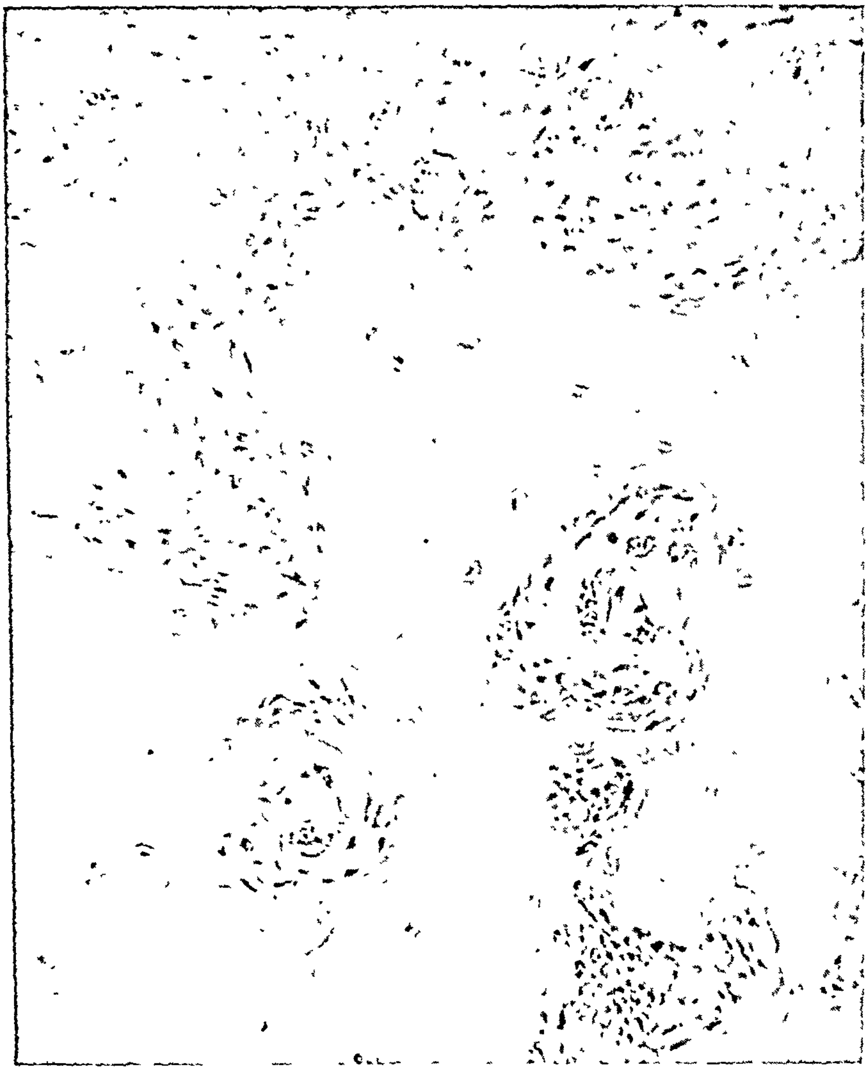

Fig. 11 (Case 4).—*Photomicrograph (high magnification) showing osteoid tissue lying in a well defined matrix of embryonal osteogenic connective tissue.*

after closure. Recovery was uneventful, and the symptoms vanished. A culture taken from the removed tissues was sterile.

Microscopic examination of the bone fragments showed them to consist of an osteoblastogenic, vascular stroma containing many multinucleated giant cells. In the stroma there were large masses of osteoid tissue in various stages of calcification and some primitive, partly calcified bone trabeculae. The latter were in the process of active alteration. The central portion of the osteoid mass appeared to be less dense than the remainder (Fig. 16).

CASE 8.—B. P., a 28-year-old man, complained of pain in the region of the left ankle of seven months' duration. The pain began immediately after he had dropped a case of milk bottles on the member. It was of a boring nature, deep in the ankle; it recurred every four or five hours and appeared to be worse at night. It was relieved by aspirin. Activity did not affect it.

There was nothing unusual in the past history.

On physical examination the patient showed no local or general changes other than moderate tenderness just anterior to the left external tibial malleolus. Study of the peripheral blood showed 11,400 white blood cells per cubic millimeter, with 53 per cent polymorphonuclear leukocytes.

Roentgenologic examination of the left ankle revealed an increased density of the bone along the superior surface of the os calcis at its midposition. Within this area there was a round, less dense zone which measured about 1.5 cm. The im-

pression of the roentgenologic department was that of osteoperiostitis (Fig 17)

With the patient under general anesthesia the involved segment of bone was excised The pain disappeared immediately after operation and the patient has remained well

Microscopic examination of the excised segment showed it to consist of quiescent dense spongy and cortical lamellar bone In the medullary spaces there was edematous, vascular fibrous marrow In some places focal collections of round cells were evident (Fig 18)

At one point in the bone there was an oval sharply demarcated zone composed of a substratum of cellular, osteoblastogenic mesenchymal tissue in which there were intercommunicated and isolated trabeculae of osteoid bone The trabeculae were largely arranged into small spongy masses which were calcified in the center Between them, in some places, there was acidophilic substance enveloping the mesenchymal cells No active apposition or resorption was noted (Fig 19)

Immediately adjacent to this area and enveloping it there was a layer of larger trabeculae composed of primitive bone Considerable appositional and osteoclastic activity was present here The surfaces of the trabeculae which faced the central osteoid tissue were serrated and indicated previous lacunar resorption The marrow cavities contained moderately cellular, edematous fibrous marrow Many thick walled vascular channels were noted There appeared to be vascular continuity of the adjacent relatively normal hyperostotic bone with that of the osteoid area It appeared that the primitive bone of the nidus was being resolved centrifugally and that osteoid tissue, which was replacing it, was again in the process of intramembranous reconstruction There may exist a cyclic change in the nidus in some of these cases which consists of alternate intramembranous ossification and resorption The adjacent bone reaction limits the spread of this process

CASE 9 —I S, a 14-year old white boy, was admitted to the Jewish Hospital complaining of pain

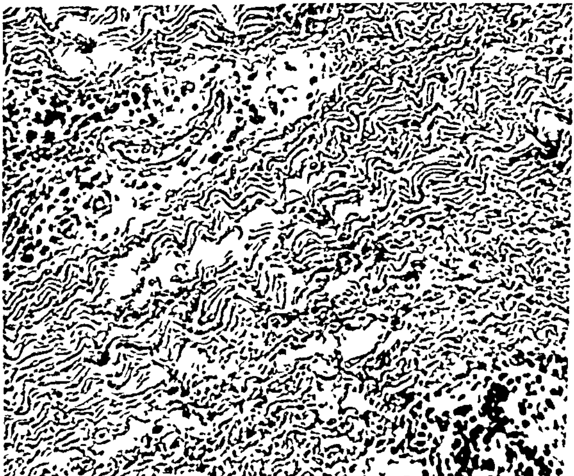

Fig 12 (Case 4) —Photomicrograph (medium magnification) showing periosteum in which there are seen foci of perivascular round cell infiltration

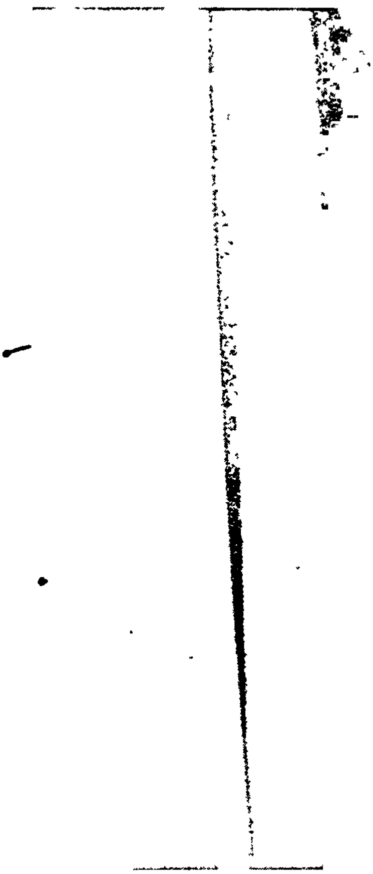

Fig. 13 (Case 5).—Roentgenogram showing indistinct oval rarefied area in the cortex of the tibia, surrounded by a zone of perifocal sclerosis.

along the right humerus of six weeks' duration. This was accompanied by pain on motion of the shoulder, especially after strenuous activity. The past and familial history were irrelevant. There was no history of trauma. Examination revealed no general abnormalities. Locally, in the region of the mid-third of the right humerus, there was a firm, indurated, tender area measuring 2 × 3 inches (5 × 7.5 cm.) in diameter. Complete blood chemistry study, including tests for calcium, revealed no abnormality. The Wassermann reaction was negative. The sedimentation rate was normal. There was mild secondary anemia. The clinical impression was that of sclerosing osteomyelitis (Garré).

Roentgen examination of the right humerus revealed an area of thickening and elevation of the periosteum along the shaft of the bone in its midportion. At about the center of the bone there was demonstrated a rarefied locule 1 cm. in diameter in a zone of extracortical calcification. In the lateral projection, definite "onion peel" was noted. This picture was suggestive of neoplasm. Whether this represented Ewing's tumor or osteoma could not be said with certainty (Fig. 20).

The patient was operated upon under general anesthesia. A muscle-splitting incision was made, through which a section of bone measuring 4 × 5 cm. was chiseled out. This contained the rarefied locule noted previously on the roentgen film. The wound was closed, and a plaster of paris spica was applied. The patient was then completely free of symptoms.

Microscopic examination of the sections consisted of hyperostotic areas of spongy bone. The trabeculae were long and wide; they were arranged in varied fashion. In some areas they were parallel to the surface of the bone, in others they were in part perpendicular and in part tangential to the long axis of the bone. The trabeculae consisted of mixed lamellar and primitive bone. The medullary spaces contained loose fibrous connective tissue marrow. In the center of the hyperostotic mass there was an oval, sharply demarcated porotic area measuring 1.2 cm. in diameter (Fig. 21). This consisted of a substratum of cellular, vascular, osteogenic connective tissue. In the center there was a large irregular mass of osteoid tissue which was irregularly calcified. Surrounding this area there was a zone of smaller masses of osteoid tissue and irregularly scattered interconnecting trabeculae of primitive reticular bone. On the surfaces of some of these trabeculae there were occasional seams of osteoblasts and multinucleated giant cells (osteoclasts) in lacunae. Towards the periphery of the oval area the mesenchymal substratum merged with fibrous connective tissue marrow which extended into the marrow spaces of the surrounding hyperostotic bone. It contained numerous large and small vascular channels. The lamellar trabeculae adjacent to the main lesion showed more bone alteration than elsewhere in the focally sclerosed zone. There was moderate central and peripheral osteoclastic resorption and beginning apposition of new bone on the surface of the trabecula. The surfaces of the trabeculae facing the nidus were serrated.

Case 10.—W. S., a 20-year-old man, was admitted to the Jewish Hospital complaining of pain in the right arm, extending from the shoulder down to the wrist. This had begun one and one-half years before, with pain in the mid-arm, while the patient was lifting a bale of material. Some time later it

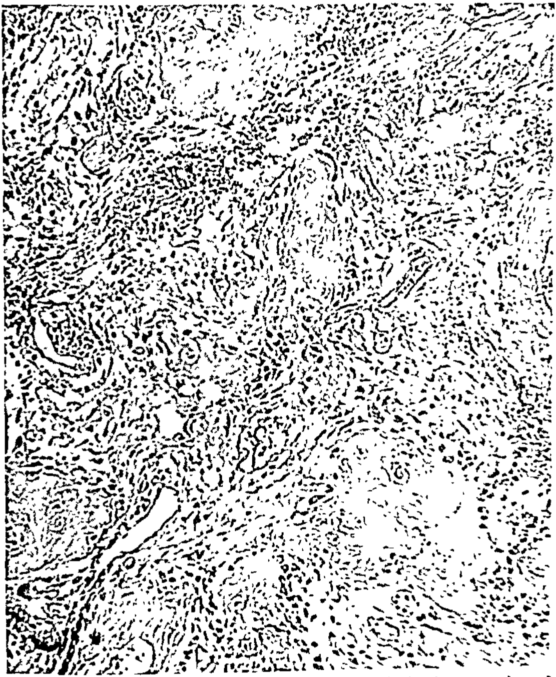

Fig. 14 (Case 5).—Photomicrograph (high magnification) of one portion of the osteoid osteoma showing osteoid trabeculae in a somewhat more [illegible] and edematous matrix. Note numerous vascular channels and round cell infiltration.

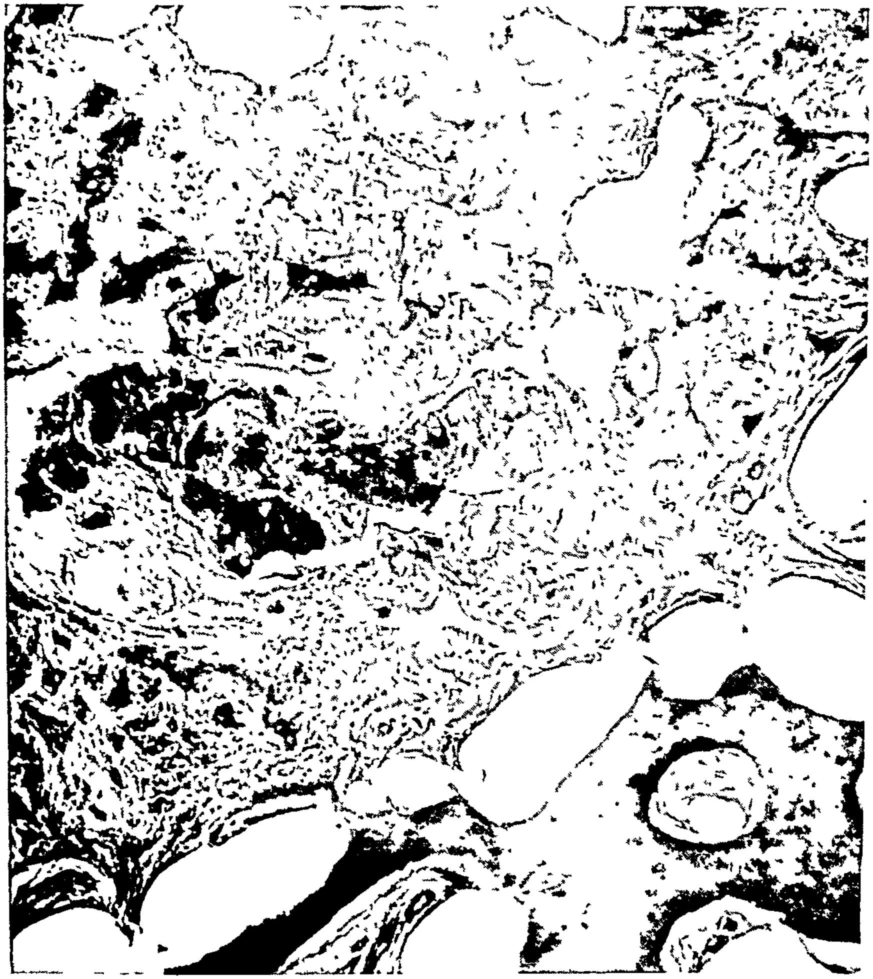

Fig. 15 (Case 6).—Photomicrograph (low magnification) showing cross section of a portion of the osteoid nidus.

began to radiate upward and then down to the wrist. It varied from sharp to dull and was relieved by taking aspirin. No swelling was noted.

Physical examination showed nothing unusual except some swelling on the posterolateral aspect of the right axilla. The peripheral blood study showed 12,500 white blood cells per cubic millimeter and 63 per cent polymorphonuclear leukocytes.

Roentgen examination of the right humerus demonstrated an area of density at the upper third of the humerus in its inner aspect. In the midportion there was an oval radiolucent area measuring 1 cm. in diameter (Fig. 22).

With the patient under general anesthesia a block of bone about 2½ inches (6.2 cm.) long and 1½ inches (3.7 cm.) wide was resected from the humerus in the region of densification.

Microscopic study of the bone section showed it to consist of cortical lamellar bone, partly of dense spongy nature and partly normal compacta. In the middle of one portion of the cortex there was a long and irregular zone which consisted of small intercommunicating trabeculae of osteoid and young fibrous bone. In the very small marrow spaces there were sclerogenous connective tissue and occasional osteoclasts. The primitive bone trabeculae merged with the surrounding larger lamellar bone trabeculae. Towards the endosteal side of the lesion the lamellar bone was undergoing central and peripheral resorption, and active new bone deposition was seen on the surfaces of the trabeculae. The marrow spaces in this area were wide; they contained fibrous connective tissue marrow.

In another section the osteoid lesion was seen to extend into the spongiosa of the bone. In this area the osteoid tissue predominated. Here, too, there were a moderate number of osteoclasts and little perifocal bone sclerosis (Fig. 23).

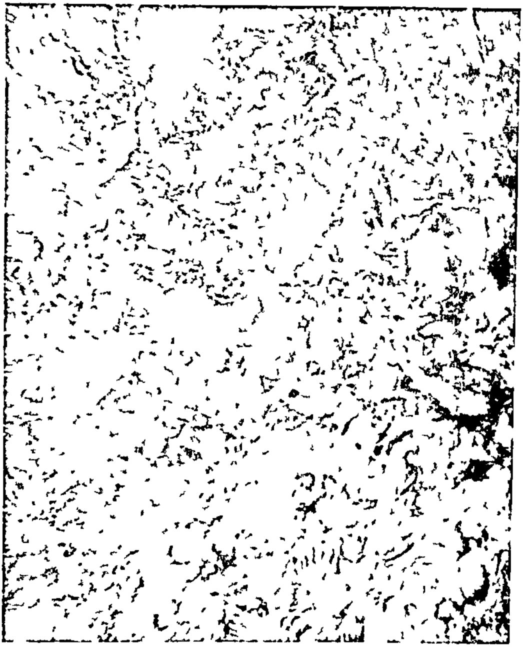

Fig 16 (Case 7) —Photomicrograph (low magnification) showing a cross section of a portion of the osteoid nidus The central portion appears to be less densely calcified

CASE 11 —S de I , a 12 year old boy was admitted to the Jewish Hospital complaining of an abnormal gait of six months duration The onset coincided approximately with an appendectomy for chronic pain in the right lower abdominal quadrant Shortly after being discharged from the hospital he noted some stiffness of the lower dorsal and lumbar portions of the spine a crooked' gait and an elevation of one shoulder For a few weeks before admission to this hospital there had been some pain and discomfort in the aforementioned area This had been worse on standing and walking and relieved on lying down One sister had died of pulmonary tuberculosis

Physical examination revealed the patient to be well developed well nourished and apparently not acutely ill The temperature pulse and respiration were normal On standing the back was held rigid and lumbar lordosis was seen There was marked tenderness over the lower two thoracic and upper two lumbar spinous processes The erector spinae muscles, especially on the left, were spastic The abdomen was scaphoid and somewhat spastic in the lower quadrants, especially on the right Tenderness and cutaneous hyperesthesia were present in the right lower quadrant There were also cutaneous hyperesthesia and increase of muscle tone anteriorly and posteriorly over the ninth dorsal to the first lumbar segment The patient was unable to sit up with the legs fully extended Straight leg raising was normal Patrick s sign was positive on the right side Backward extension of the lower extremity was limited on the right, but it was full when the leg was abducted at the same time The

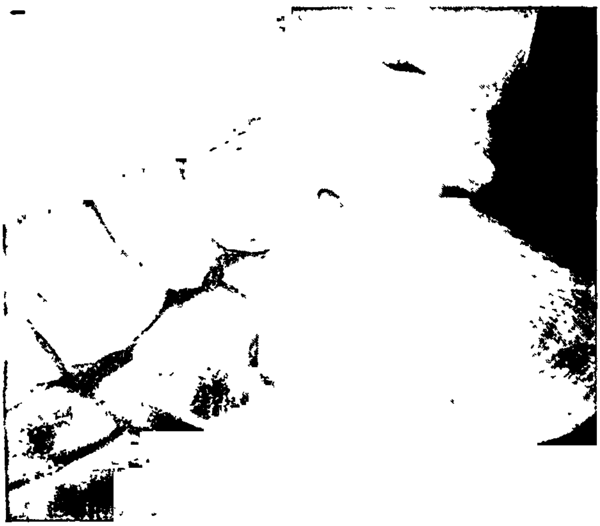

Fig. 17 (Case 8).—Roentgenogram showing a round radiolucent area in a zone of increased density in the midportion of the upper surface of the os calcis.

clinical impression was that of osteomyelitis of the spinous processes. The Mantoux test (0.1 mg.) gave a negative result. Examination of the blood and of the urine revealed nothing unusual. Roentgen study of the dorsolumbar portion of the spine was reported as giving negative results. Subsequent review of the films revealed an oval area of rarefaction at the tip of the spinous process of the first lumbar vertebra (Fig. 24).

With the patient under general anesthesia, a 4-inch (10 cm.) incision was made over the lower two thoracic segments and the upper portion of the spine to the right of the spinous processes. The ligaments were puffy and the muscles grayish pink. The spinous processes and part of the transverse process of the lower two thoracic spines were excised. A culture taken from the operative field was completely negative. The impression was that of osteomyelitis of the spinous processes.

Microscopic examination of the excised fragments showed that one fragment consisted of a portion of cortical bone, to which were attached periosteum and a band of densely hyalinized connective tissue. The structure of the cortical bone appeared to be unchanged except for some widening of the haversian canals. The resultant spaces contained edematous, delicate connective tissue marrow and a sprinkling of myelogenous cells. Immediately underneath the periosteum at one point there was a circumscribed area composed of a substratum of cellular osteoblastogenic tissue containing many inactive multinucleated giant cells. Within this tissue there were interconnecting trabeculae of partially calcified osteoid tissue (Fig. 25).

Adjacent to the periosteum at one point there was seen striated muscle. In places the muscle fibers appeared small and atrophic and were replaced by connective tissue and fat cells. Local area of polymorphonuclear leukocytic and round cell infiltration were occasionally seen. The blood vessels were thick walled and showed endarteritic changes (Fig. 26).

Case 12.—K. G., a 21-year-old man, was admitted to the Jewish Hospital complaining of pain over the region of the lower thoracic spine of two and a half years' duration. The pain was intermittent, lasting for variable periods, and appeared to be entirely unrelated to general activity or motion of the spine. There was no history of trauma.

Physical examination revealed nothing of note. Locally there was point tenderness in the region of the tenth and eleventh thoracic vertebrae, about 2 cm. to the left of the midline. Adjacent sacrospinalis muscle spasm was present bilaterally. There was lower thoracolumbar scoliosis to the left. General neurologic examination gave negative results.

Laboratory studies revealed nothing unusual. The urine was within normal limits. Study of the peripheral blood revealed no significant abnormality. The Wassermann reaction was negative. The hematologic values for urea and sugar were normal. Manometric spinal tests and chemical studies of the spinal fluid gave normal results.

Roentgenograms of the vertebrae showed an osteogenic bridging between the inferior articular surface of the twelfth dorsal and the first lumbar vertebra as well as between the inferior articular surface of the first and second lumbar vertebrae on the left side. This was interpreted as representing ossification and calcification of the vertebral segments secondary to trauma or infection. There was also slight scoliosis to the right of the lumbodorsal portion of the spine, with the apex of the curve at the level of the first lumbar vertebra. Restudy of the roentgen films after operation revealed considerable ossification of the tissues adjacent to the left pedicle and lamina of the first lumbar vertebrae. Some rarefaction was seen in the center of the sclerotic area, in the region of the left transverse process (Fig. 27).

With the patient under general anesthesia, an incision was made over the twelfth thoracic and the first two lumbar vertebrae. The muscles were indurated and fibrotic; the laminae over the first lumbar vertebrae were rough and irregular. A curet struck a soft vascular area at the center of the lesion which was purple-red. This area was well curetted and the wound was closed. The impression was that of a giant cell tumor of the spine.

The microscopic report noted that the irregular fragments of bone showed a variegated picture.

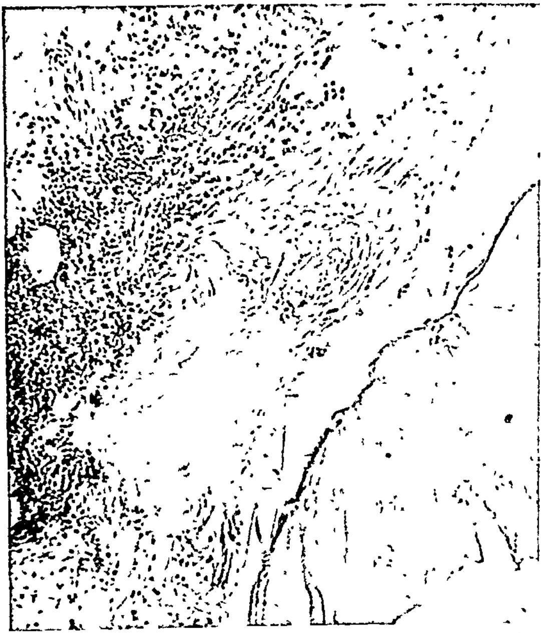

Fig. 18 (Case 8) —Photomicrograph (high magnification) showing vascular fibrous marrow and round cell infiltration in the medullary spaces of the excised spongy bone adjacent to the nidus

In one area the specimen consisted of small, irregular trabeculae of calcified early lamellar bone. Active bone apposition and lacunar resorption were noted on the surfaces of the trabeculae. In the marrow spaces there was edematous fibrous connective tissue.

Adjacent to this hyperostotic area there was another, which consisted of larger, more widely separated lamellar bone trabeculae with similar but more edematous connective tissue marrow and with some round cell infiltration

In another section there was a sclerotic area of lamellar bone, adjacent to which there was a sharply demarcated area consisting of a substratum of osteoblastogenic connective tissue and osteoid tissue The osteoid tissue was in the form of irregular, partially calcified masses and some trabeculated areas In the mesenchymal tissue surrounding the preosseous tissue there were multinucleated giant cells of varied size and shape.

Adjacent to one of the bone fragments there was a wide layer of dense hyalinized connective tissue in which were focal collections of round cells. Many thick-walled blood vessels were noted. There was also an area of striated muscle, fragmented and interrupted. The muscle fibers were atrophic in some places and hypertrophic in others. Large areas were replaced by connective tissue in which there were islands of muscle fiber. Occasional focal collections of round cells, plasma cells and histiocytes were seen (Fig. 28).

COMMENT

An abundant literature is accumulating on the subject of osteoid ostema. Its clinical, roentgenologic and morphologic manifestations have been well and unequivocally delineated; its etiology and pathogenesis, however, are still subject to conjecture and con-

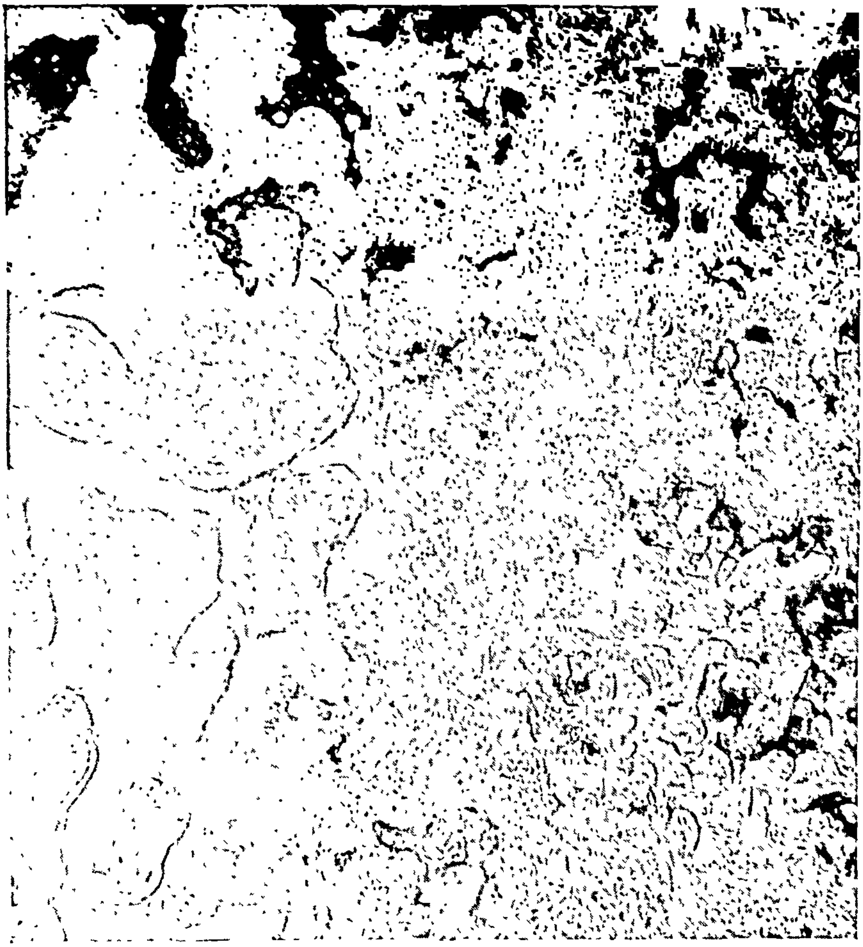

Fig. 19 (Case 8).—Photomicrograph (low magnification) showing cross section of a portion of the nidus of calcified osteoid tissue in a mesenchymal matrix and adjacent bone.

troversy. Most investigators embrace Jaffe's concept without reservation; they maintain that the lesion is a distinctive, slow-growing, benign tumor of the bones and they endorse the term "osteoid osteoma." Other authors maintain that many contradictory facts must be explained before a true evaluation can be made of the evolution of this disease. A third group of contributors to the literature categorize this condition as a localized bone infection in the nature of either cortical bone abscess or sclerosing *nonsuppurative osteomyelitis*. It appears that further evaluation of the literature and a more intensive study of future cases is necessary in order to arrive at a final conclusion.

Prior to the publication of Jaffe's first paper on this subject in 1935 the lesion was described in the literature by a number of authors as a unique type of inflammatory disease of bone. In 1924 Henderson expressed the opinion that it represents sclerosing nonsuppurative osteomyelitis or chronic sclerosing osteitis. In 1927 Heine described a typical case and concluded that he was dealing with a nonspecific localized infection which had metastasized from an inflammatory focus elsewhere in the body. In 1929 and subsequently in 1938 Phemister analyzed some typical cases; he decided that the lesions were characteristic of localized low grade *infections of bone in healing stages*. Hitzrot (1930) set forth a characteristic case of what he thought was sclerosing osteomyelitis. Bergstrand (1930) also reported 2 cases, stating that in his opinion the lesions were neither inflammatory nor neoplastic, but developmental aberrations of a diseased embryonal anlage. In 1933 Wishner termed the lesion sclerosing osteomyelitis of Garré Many other German and French authors described cases in which the clinical and roentgen pictures were typical of the condition presented in this paper They also interpreted the condition as chronic inflammation of bone

Subsequent to the publication of Jaffe's paper in 1935, Mondolfo described 3 cases of osteoid osteoma, comparing them with 4 instances of inflammatory disease of spongy bone The histopathologic pictures of the two types of lesion were so analagous that he deduced that they represented different stages of inflammation In 1940 Ottolenghi reported a typical case of osteoid osteoma There was indisputable histologic evidence of chronic inflammation in the nidus, i e, edema plasma cells, lymphocytes and histiocytic cells Brailsford (1942) discussed in some detail 6 cases of Brodie's abscess In 5 of these the clinical and roentgen picture was similar to that of the entity we now term as osteoid ostema In 3 instances the microscopic picture was also said to be typical In 2 of the cases beads of pus were observed, and in 3 of them Staphylococcus aureus was cultured from the lesion Brailsford also came to the conclusion that osteoid osteoma was a stage in the process of inflammation of bone

In 1943 Brown and Ghormley searched the records of the Mayo Clinic for a ten-year period, limiting their investigation to single cortical lesions of bone which ran a benign course and were subjected to surgical excision They found 26 cases under the classification of Brodie's abscess and 5 under Garré's disease Of the lesions in the former group, 17 were located in the tibia The symptoms were of less than one year's duration in 11 instances one to six years in 8 others and up to thirty five years in the remainder Redness was rarely seen Fourteen patients were cured by surgical eradication of the lesion Chronic inflammatory elements (round cells, giant cells) were observed in 10 cases Cultures yielded Staph aureus in 2 instances and micrococcus in 2 others Roentgenographic films were characteristic of osteoid osteoma in all the cases The authors concluded that there was no evidence of new growth but that an infection was present, due either to trauma or to distant primary foci Since microscopic study was not emphasized, these cases could not all be accepted as actual instances of osteoid osteoma

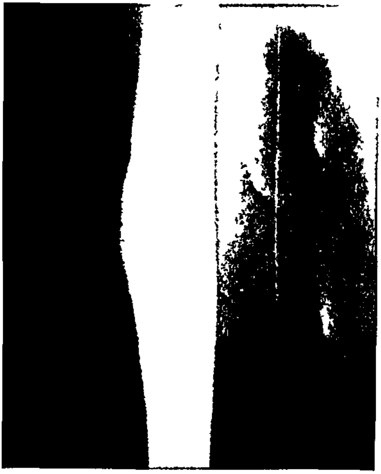

Fig 20 (Case 9) —Roentgenogram of the right humerus, showing an oval radiolucent area between the surface of the cortex and the adjacent periosteal new bone *The latter causes widening of the bone at this point* Note suggestion of onion peel appearance in the upper half

In a more recent paper (1949) from the Mayo Clinic (Jackson, Dockerty and Ghormley) a review was made of the collected records of conditions previously diagnosed as sclerosing osteitis, Brodie's abscess, solitary cortical abscess, localized osteitis fibrosa, osteofibroma and osteoma In 48 of the 150 culled cases the clinical and roentgen features were typical of osteoid osteoma Microscopic examination confirmed only 20 of the latter as belonging to this group The only differentiating factor between these 20 cases and some of the others was the presence of chronic inflammatory changes in the latter This was considered by the authors as inconclusive but substantiating evidence for the neoplastic origin of osteoid osteoma

When the observations of the various competent investigators is considered, the evidence is so finely balanced that it is not possible to draw a final conclusion as to the nature of the lesion

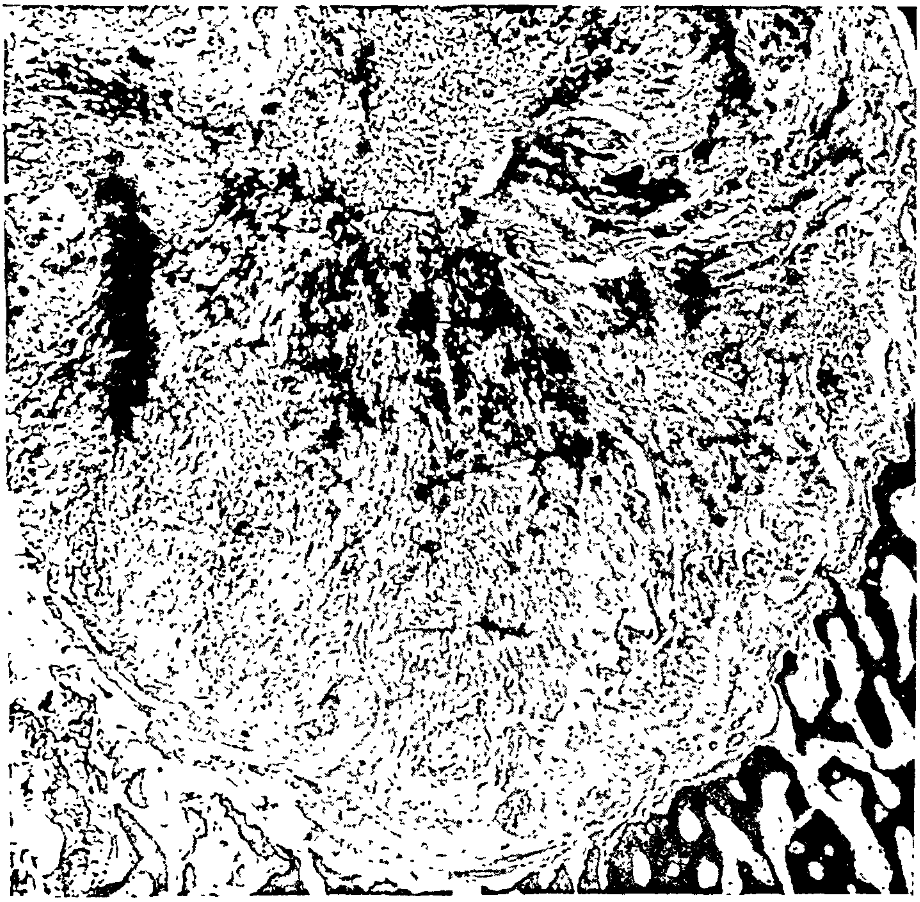

Fig. 21 (Case 9).—Photomicrograph (low magnification) shows a cross section of the nidus and the adjacent sclerotic bone.

It may therefore be pertinent at this time to reconsider some of the clinical and morphologic features that characterize the condition now popularly known as osteoid osteoma and to discuss them in terms of their possible relation to its etiology and pathogenesis.

Age incidence yields no clue as to the origin of the disease. Mondolfo maintains that persons in the years of life when this lesion is common, i.e., from 10 to 25, are more characteristically affected by inflammation than by tumor formation. It must be conceded, however, that solitary growths are the commonest neoplasms of the skeleton, and they develop chiefly in the young. No specific significance can be attributed to the fact that the age incidence for the two conditions coincide.

The symptom of pain in osteoid osteoma antedates all other signs and symptoms by weeks or months. In tumor formation pain is, as a rule, a late symptom, since it is essentially due to the mechanical pressure of expanding tissue on the adjacent encasing tissues. In inflammatory disease pain is an early manifestation. If one considers osteoid osteoma a new growth, it is difficult to explain the fact that despite the failure of this lesion to expand beyond its usual size of 1 cm. the pain becomes progressively worse. Some authors contend that the nocturnal nature of the pain and its relief on administration of salicylates are also more indicative of inflammatory disease than of tumor.

Trauma is mentioned in the anamnesis in 30 to 40 per cent of cases of osteoid osteoma. It has been considered by most authors to be purely coincidental and of no significance. It is premature to dismiss thus casually an incident

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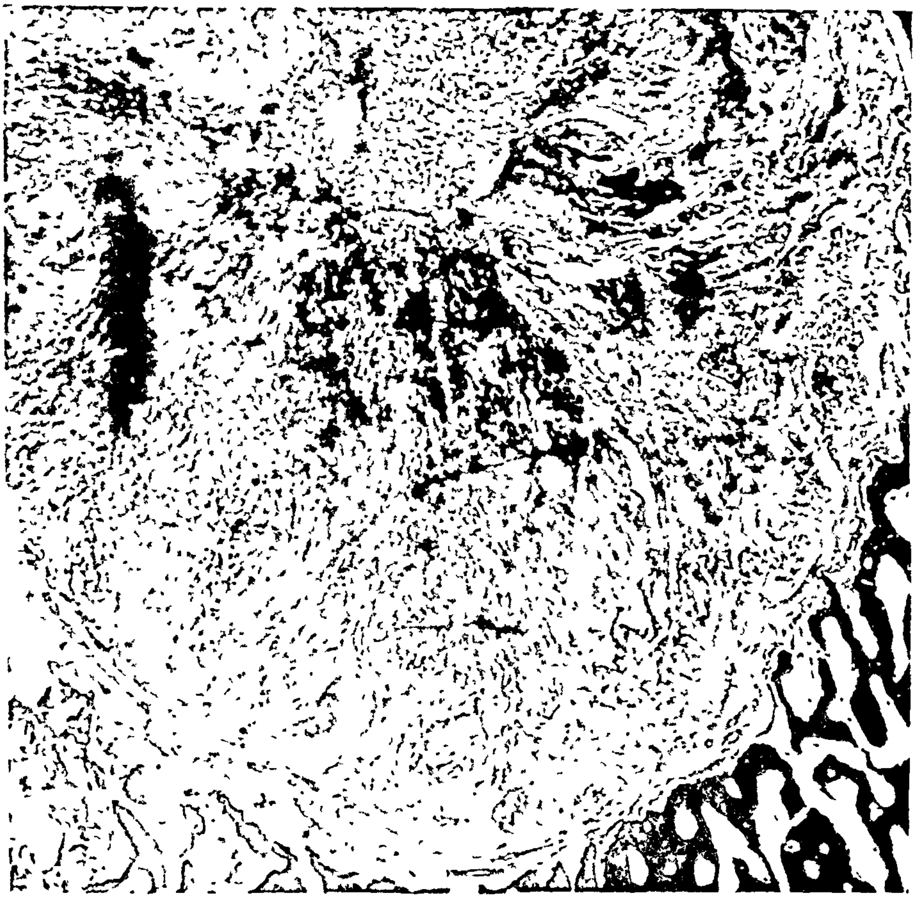

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Trauma is mentioned in the anamnesis in 30 to 40 per cent of cases of osteoid osteoma. It has been considered by most authors to be purely coincidental and of no significance. It is premature to dismiss thus casually an incident so frequently associated with a disease. The fact that a latent period exists between the trauma and the onset of symptoms does not exclude the trauma as an initiating factor. It is well known that trauma is an important factor in bone infections in the young; its relation to new growths is still conjectural. It may also be relevant to consideration of the causation of *this disease that it occurs predominantly in the* lower extremity and that it is distinctly more prevalent in the male than in the female. This parallels the conditions in inflammatory disease of bone in children and adolescents in *which trauma is a significant factor.*

The presence of joint swelling and stiffness, limitation of motion and contractures, as well as changes in the musculature adjacent to the lesion, such as hypertonus, atrophy and spasm, are more apt to be associated with inflammatory disease of bone than with a minute static growth. The same may be said of local tenderness, which is commonly observed in cases of osteoid osteoma, and of local heat and redness, which are seen only occasionally.

Roentgenographic differentiation between inflammation and osteoid osteoma has apparently been difficult. Many of the proved cases have been and still are being interpreted as chronic inflammatory disease. Brailsford observed: "*The resemblance to the radiographic* appearance of certain bone abscesses is so strong as to cast doubt on any other interpretation." It has also been correctly asserted that no benign tumor of bone has been known to produce contiguous perifocal sclerosis.

It has been stressed by many that in this condition there has been no palpable clinical, bacteriologic or morphologic evidence of inflammation. None of the patients described have ever been known to have chills, fever or tachycardia. In most instances the study of the peripheral blood has shown no unusual changes. It may be said significantly, however, that no systematic study has been attempted to determine this factor at different stages of the disease. In only 3 of our cases were sedimentation rates observed. In 2 of them the rate was within normal limits; in the third it was 30 mm. in one hour. There was no apparent explanation for this elevation in rate. In 4 cases there was moderate to high leukocytosis (12,500 to 21,800) white cells per cubic millimeter of blood and the polymorphonuclear leukocyte count ranged up to 95 per cent. Closer observation of these factors in the cases to be studied in the future would perhaps shed some light.

Bacteriologic studies of patients with osteoid osteoma have been sporadic and unorganized. Blood cultures and virus studies have not been made, and cultures of the lesion and *adjacent bone have only been done in some* cases. Most of the latter have yielded negative results. In the first case reported by Jaffe in 1935 a diptheroid bacillus was observed on culture of swabbings of the bone removed at operation. In 1940 2 of his patients yielded cultures of Staph. aureus. He assumed that these were all contaminants of extraneous origin. Brailsford was able to isolate Staph

Fig. 22 (Case 10).—Roentgenogram of the upper third of the right humerus, showing an oval radiolucent zone in an area of perifocal densification.

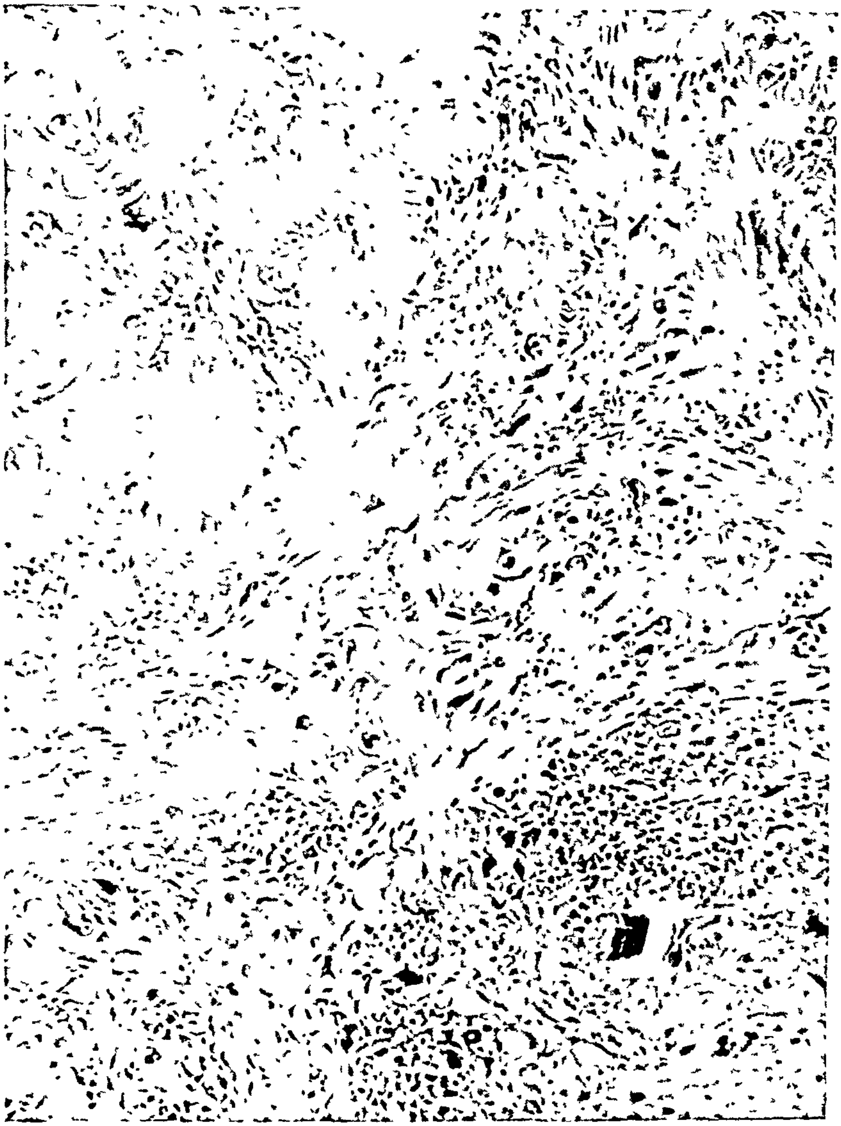

Fig. 23 (Case 10).—Photomicrograph (high magnification) showing osteoid tissue in a matrix of mesenchymal tissue and some osteoclasts.

aureus in 3 of the 6 cases of what he considered to be Brodie's abscesses even though the histologic morphologic picture coincided with that which is considered typical for osteoid osteoma. In the present series of cases, two cultures were attempted; both gave negative results. It is apparent that cultures made from areas of low grade chronic infection of bone may yield positive results in only a small percentage of cases It cannot be presumed that the positive cultures that were obtained were merely contaminants until a complete and sequential study has been made of many of the cases to be observed in the future. This should include blood culture examinations at different intervals, as well as bacteriologic analysis of the nidus, the contiguous bone and the soft tissues. The reason for inclusion of soft tissues in the bacteriologic examination will soon be explained.

The weakest link in the hypothesized inflammatory origin of osteoid osteoma has been the general absence of any cellular elements of inflammation. Only Ottolenghi, Brailsford and

Brown and Ghormley have maintained that such histologic changes were demonstrable in their cases The remaining authors advocating the inflammatory origin of this condition merely inferred that in long standing infections of bone these elements are not necessarily pathognomonic Phemister postulated that attenuated low grade bone infections exist from which bacteria cannot be grown or can be grown only occasionally and little or no microscopic evidence of inflammation is present No mention is made of microscopic examination having been made in any of the cases in the literature of the soft tissues i e, periosteum or muscle adjacent to the bone lesion Only Voshell and Appleby observed that in their case there existed muscle changes near the affected bone in the form of myositis ossificans, hemorrhage and round cell infiltration, Hamilton described edema and congestion of the tissues adjacent to the lesion when it lay near the cortex Other authors have mentioned thickening and edema of the periosteum in such cases In the 12 cases described in this paper there was histologic evidence of chronic inflammation within or adjacent to the nidus in 3 instances In 3 other cases we observed round cell infiltration and other elements of chronic inflammation in the periosteum inadvertently removed with the bone specimen Similarly, in the 2 instances in which muscle tissue accompanied the specimen there was definite inflammatory change within this tissue Whether these alterations of the soft tissues are primary or secondary is conjectural In the further study of osteoid osteoma it appears that adjacent periosteum and muscle should be thoroughly investigated

A number of authors have described clinical changes in the joints adjoining the bone affected with osteoid osteoma This was a common observation Sherman demonstrated histologically that in 2 of his cases of osteoid osteoma the adjacent joint showed nonspecific inflammatory synovitis which subsided completely with excision of the osteoma Inflammation of joints is not uncommonly induced by foci of infection in the metaphyses of long bones not directly involving the joints The joint is spontaneously restored to normal on elimination of the focus of infection Although similar reactions of joints are occasionally cited in association with noninflammatory bone lesions in the metaphysis they are uncommon

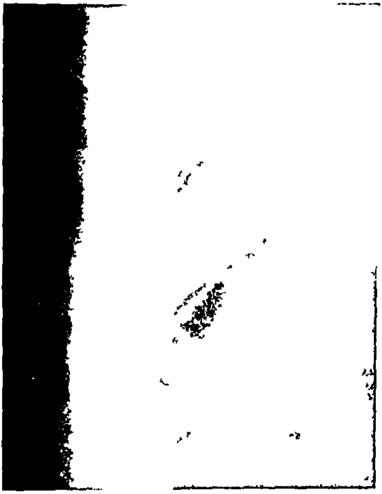

Fig 24 (Case 11) —Roentgenogram showing an oval area of radiolucency at the tip of the spinous process of the first lumbar vertebra No perifocal thickening is seen

The elements visualized in the histomorphologic picture of osteoid osteoma namely the osteoblastogenic connective tissue matrix osteoclasts, osteoid tissue and atypical bone trabeculae, were in no way identifiable as neoplastic In the majority of cases the preosseous mesenchyme underwent alteration through the deposition of acidophilic material in the interstices of the matrix, with resultant formation of osteoid tissue This then became calcified and was resorbed and replaced by atypical primitive bone This process of intramembranous ossification is not peculiar to this lesion, it is basically a phase in the normal ossification of growing bone and it is also seen in various stages of repair of injured and inflamed bone in heterotopic ossification in some osteomas of the skull in osteitis deformans and in other fibro osseous dysplasias In some of these conditions the mature bone cells appear to under-

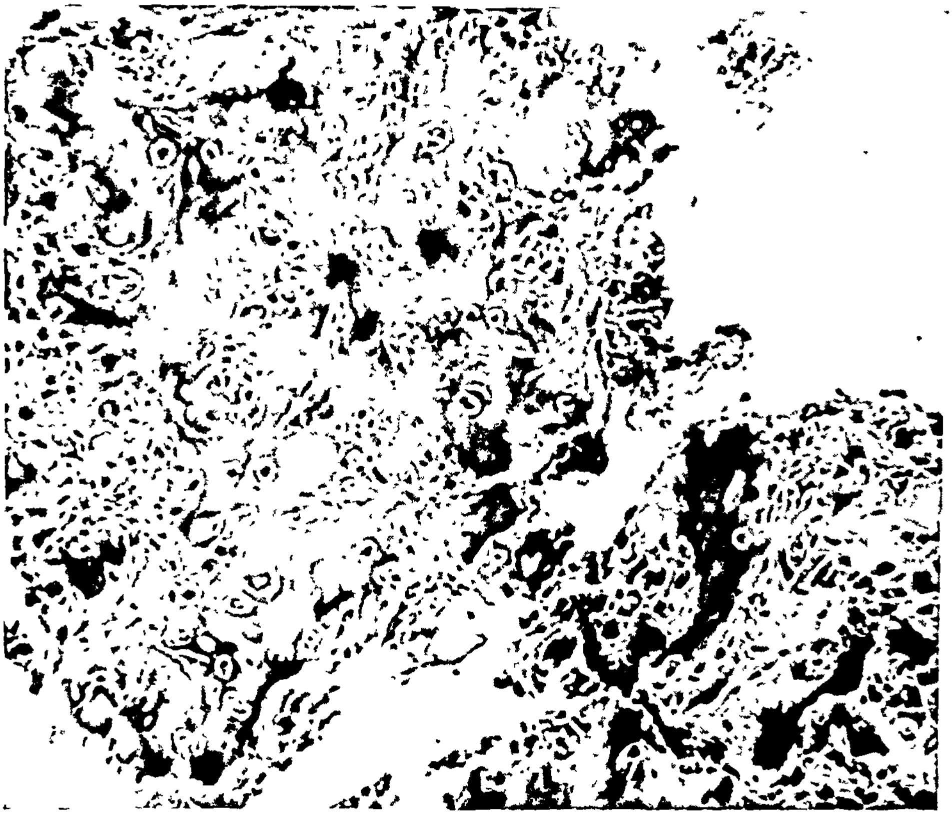

Fig. 25 (Case 11).—Photomicrograph (moderate magnification) showing cross section of a portion of the nidus consisting of calcified osteoid tissue in an osteoblastogenic matrix and some giant cells.

go metaplasia; there is a solution of the inorganic bone substance and a reversion of the osteocytes to their mesenchymal status. Since cells derived from mesenchyme are intermutable, they may redifferentiate into any of the sclerogenous elements; i.e., fibroblasts, osteoblasts, osteoclasts, chondroblasts, etc. Thus, any one of these elements or all of them may be observed during the reparative processes in bone In osteoid osteoma, osteoid tissue and osteoclasts are predominant; in only 1 case cited by Geschickter and Copeland) was there an intermediary cartilaginous phase.

There are other morphologic features which are inconsistent with the conception of osteoid osteoma as a neoformation. In cortical lesions the nidus is sharply demarcated by the surrounding bone, but there is no limiting capsule On the contrary, the connective tissue on its outer aspect often merges imperceptibly with that of the marrow spaces in the perifocal zone. Furthermore, there has been observed in some of our own cases and in some of the cases reported by Bergstrand and others that a continuity often exists between the lamellar bone of the perinidal area and the atypical trabeculae of the nidus. There also appears to be a vascular continuity of the two zones. Another significant observation in some cases was the presence of partially resorbed lamellar trabeculae both in the connective tissue and in the osteoid zones of the nidus. It is difficult to *reconcile the neoplastic origin of this condition* with the presence of residual inclusions of lamellar bone in the lesion.

Only a rough concept exists as to the sequential evolution of osteoid osteoma from the various morphologic patterns observed. Jaffe postulated in 1945 that the condition was initiated through the invasion of bone by vascular elements from the vascular canals producing a creeping resorption. The bone in this area was replaced by osteogenic connective tissue, which was carried on the walls of the vessels. The

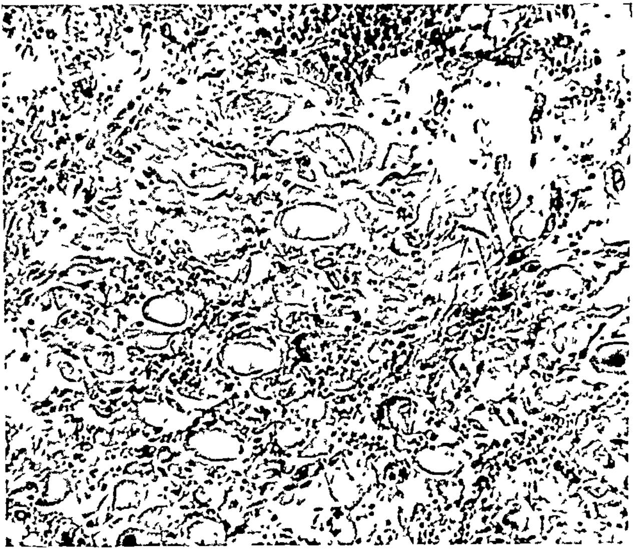

Fig 26 (Case 11) —Photomicrograph (high magnification) showing an area of striated muscle unintentionally removed with the bone tissue in this case Polymorphonuclear and round cell infiltration is observable as well as edema and degenerative changes of the muscle fibers

connective tissue was then replaced by atypical bone Concomitantly there was deposition of periosteal new bone of normal architecture In this way there appeared a delimited area composed of dense trabeculae of atypical bone with few residua of normal bone In the subsequent phases of the disease this is said to be largely replaced by vascular osteogenic connective tissue in which there is formed osteoid tissue The latter phase is the one in which the lesion has most often been observed clinically

The initial stages have not been observed in morphologic studies of osteoid osteoma, and it is conjectural whether they correspond to the foregoing description It is evident however from observation of our own cases that concentric lacunar absorption does take place originally This is confirmed by the presence of the serrated borders on surfaces of the trabeculae of the lamellar bone which face the osteoid nidus The nature of the stimulus for this process is obscure, as is the reason for its limitation to an area 2 cm or less in diameter It is said by some authors that the restriction in growth may be due to the confining influences of the compensatory sclerosis adjacent to the nidus This does not explain instances in which the lesion occurs in the spongiosa of bone where perifocal sclerosis is limited or even absent

It has been observed in most of the cases that there is constant alteration of the tissues in the nidus consisting of alternate construction of osteoid and atypical bone and resorption of these elements The cycles may go on at different intervals or concomitantly thus yielding a variegated arrangement of tissues in the same lesion The alteration appears to go on mostly from the center of the lesion outward leaving in some instances a circle of atypical bone on the periphery Whether this cycle keeps on

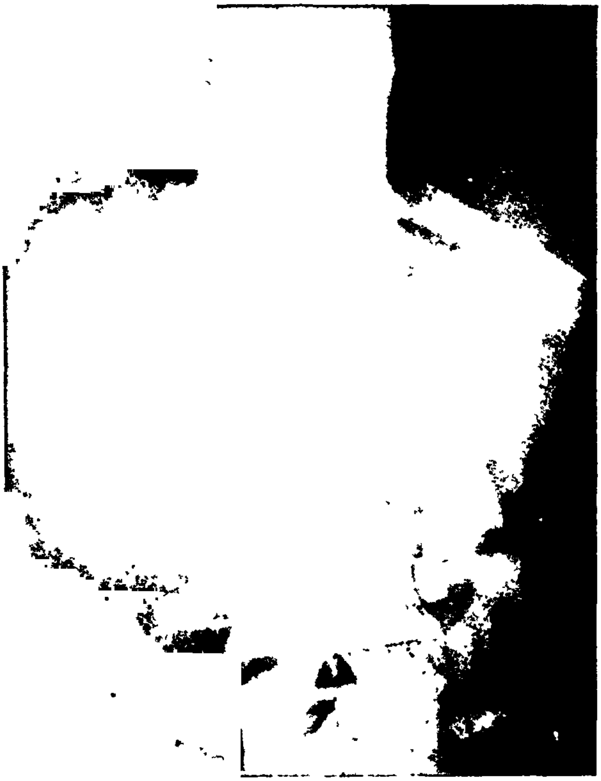

Fig. 27 (Case 12).—Roentgenogram showing osteogenic bridging between the twelfth dorsal and first and second lumbar vertebrae and some ossification of adjacent tissues. A circular area of rarefaction is seen in the center of a sclerotic area in the region of the left transverse process of the first lumbar vertebra.

indefinitely or whether the focus ultimately merges into another phase of sclerosing osteitis or ossifying periostitis cannot as yet be stated. The nidus has never been seen to invade the surrounding tissues, nor have the perifocal tissues been observed to obliterate the nidus.

SUMMARY

The clinical, roentgenologic and pathologic features in 12 new cases of "osteoid osteoma" are presented. The etiology and pathogenesis of this disease are discussed in the light of the reviewed literature and the study of these cases. The weight of evidence appears to favor the concept that this lesion is a unique phase of chronic osseous inflammatory processes rather than a neoplastic change. It is proposed that, if this contention is conclusively proved and accepted after further study of future cases, the appellation "osteoid osteitis" be used to designate this condition.

RÉSUMÉ

On présente les caractéristiques cliniques radiographiques et pathologiques de 12 nouveaux cas d'ostéome ostéoïde. L'étiologie et la pathogénie de cette maladie sont discutées à la lueur des articles passés en revue et des études de ces cas. Il semble bien que l'on doive arriver à la conception que cette lésion est la phase unique d'un processus inflammatoire chronique osseux, plutôt que d'une évolution néoplasique. On proposa que, si cette manière de voir est véritablement confirmée et acceptée après une étude approfondie des cas futurs, l'appellation "ostéoïde ostéitis" soit employée pour désigner cet état.

RESUMEN

Se estudian los aspectos clínico, roentgenológico y anátomopatológico de 12 nuevos casos de "sarcoma osteoide." A la luz de la literatura estudiada y del examen de estos casos se estudia la etiología y patogenia de esta enfermedad. Los datos existentes parecen favorecer el concepto de que esta lesión representa una fase única de un proceso óseo inflamatorio crónico más que una alteración neoplásica, proponiéndose que si se comprueba de modo concluyente este aserto y llega a aceptarse, después de estudiar los casos que se presenten en el futuro, se emplee el término de "osteitis osteoide" para denominar este proceso.

RIASSUNTO

Descrive gli aspetti clinici, radiologici e patologici di 12 nuovi casi di "osteoma osteoide." Discute l'etiologia e la patogenesi della malattia in base ad una revisione della letteratura ed all'osservazione di questi casi. La conclusione piu' appropriata e' quella che non si tratti di un vero processo neoplastico, ma di una speciale fase di un processo infiammatorio cronico. Se l'esame di altri casi confermera' questa conclusione, sara' opportuno sostituire il termini di "osteoma osteoide" con quello di "osteite osteoide."

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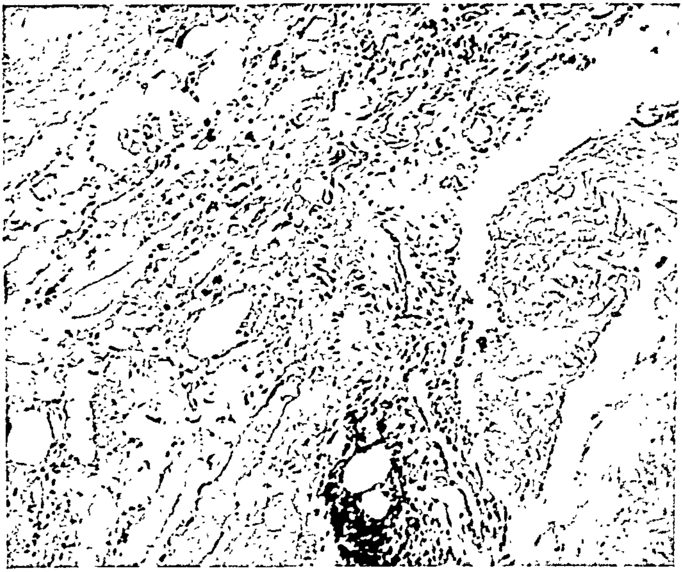

Fig. 28 (Case 12).—Photomicrograph (medium magnification) showing an area of striated muscle fragmented, interrupted and replaced by connective tissue. The muscle fibers are of varied size, and foci of round cell infiltration are seen.

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Transgastric Pancreatocystogastrostomy

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THE pathogenesis of pancreatic cysts is still controversial. Various theories have been put forward, ascribing the cysts to defective development of acini or ducts, obstruction due to calculi or annular scar formation, tumors, sterile or infected emboli, inflammatory processes in the gallbladder or the pancreas, parasitic infestation and trauma.[1]

Pseudocysts, it is generally agreed, are secondary to trauma or inflammatory processes in the gallbladder or the pancreas.[2]

Ballin and Saltzstein[3] reported a case of pancreatic cyst following cholecystectomy. It has been suggested that trauma is overemphasized.[4] Mahorner's series[1d] showed 17 per cent due to trauma; Zieman[5] quoted 20 to 35 per cent; Meyer and his associates[6] reported 51 per cent. It is reasonable to suppose that a sharp blow against a relaxed abdominal wall might crush the body of the pancreas against the lumbar vertebrae over which it lies. Boyd[7] stated that after an injury to the pancreas due either to trauma or to inflammation, secretion escapes from the traumatized area into the lesser peritoneal sac. The foramen of Winslow may then become sealed off and form a cyst. The cyst may or may not contain ferments. Tissue digestion takes place only if the ferments are present and are activated by escaping bile or duodenal secretions.[1c] The absence of ferments does not necessarily imply that the cyst is of other than pancreatic origin.

ANATOMIC CONSIDERATIONS

The pancreas is a retroperitoneal gland lying transversely in the epigastrium and left hypochondrium. The head of the pancreas lies in the concavity of the duodenum. The body rests on the first or second lumbar vertebra with the aorta, the superior mesenteric artery, the left renal vein, the crura of the diaphragm, the left adrenal gland and the left kidney interposed between it and the posterior abdominal wall. The tail terminates above the left kidney and at the basal surface of the spleen. The head of the pancreas is attached anteriorly by areolar tissue to the transverse colon. The remainder of the anterior surface of the pancreas, from neck to tail, forms a considerable portion of the stomach bed. It is separated from the stomach by the lesser peritoneal sac, the posterior wall of which forms the peritoneal covering of the anterior surface of the pancreas. The inferior surface of the pancreas derives its peritoneal covering from the posterior layer of the transverse mesocolon.

Owing to the anatomic position of the pancreas against the posterior abdominal wall, cysts can only extend forward and toward the line of least resistance. Theoretically the cyst could avail itself of almost any position in the abdominal cavity or pelvis. Adams and Nishijima[1a] found the cysts located between the stomach and liver; posterior to stomach and pressing against the gastrohepatic omentum; along the lesser curvature of the duodenum in the head of the pancreas; along the lesser curvature of the stomach, and in the root of the mesocolon. Berkay[8] listed the three most common locations in the order of their frequency as follows:

1. Behind the gastrocolic ligament and presenting between the stomach and the colon.
2. Under the gastrohepatic omentum and presenting between the stomach and the liver.
3. Between the layers of the transverse mesocolon, either behind the colon or below it.

The location of the cyst is very important and plays the deciding role in the choice of internal drainage.

DIAGNOSIS

The incidence of pancreatic cysts is about equal for the two sexes, and the majority of patients are in the middle-aged group.[1a] This sex balance has been explained by suggesting that women are more often prone to disease of the gallbladder and men are more frequently subject to trauma.

A pancreatic cyst may be of short or long duration, depending on the cause The symptoms are varied and are probably related to the degree of inflammation, the rate of growth and the amount of pressure on neighboring organs The most common symptom is deep seated pain in the epigastrium or right hypochondrium The pain may be referred to the back There may be nausea vomiting and a feeling of fullness in the upper part of the abdomen, most marked after meals Leukocytosis and fever depend chiefly on the degree of inflammation or infection present Pinkham[15] reported a comparatively high incidence of infection Jaundice, glycosuria and "pancreatic stools" are rare An abdominal mass is usually present, and this may be the only sign

Diagnosis at times is elusive A careful history should be taken An attempt to determine the onset and course of the tumor is made Any evidence of trauma, excessive alcoholic intake or previous disease of the gallbladder or the pancreas is noted Beloff,[9] however, considers a previous gallbladder or pancreatic history of not too great importance diagnostically

A thorough physical examination is done In women, this should include a bimanual examination to exclude pelvic tumors Some other conditions to be considered are cysts of the liver, omentum and mesentery, hydrops and tumors of the gallbladder, gumma of the liver, retroperitoneal tumors and Hodgkin's disease, tumors of the stomach and spleen, kidney cysts and abscesses, aneurysm of the abdominal aorta, and the subphrenic abscess which may fill the lesser sac and present an epigastric tumor

A smooth tumor above the umbilicus in the midline or in the left hypochondrium is always suggestive of a pancreatic cyst The tumor may be tense or slightly fluctuant It may be movable but it rarely moves with respiration Attempts to needle or trocar a cyst through the anterior abdominal wall or retroperitoneally are dangerous and to be discouraged

Probably the most valuable diagnostic aids are the upper gastrointestinal series the barium enema and the I V pyelogram Such studies will show either gastrointestinal or renal disease or will reveal the presence of an extrinsic mass Laparotomy is the final diagnostic test

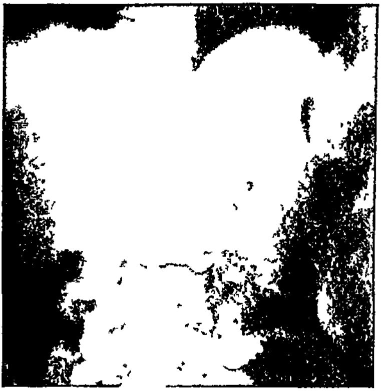

Fig 1—Cyst in region of tail of pancreas (AP view)

CLASSIFICATION

Pancreatic cysts have been variously classified by different authors [11] Grandclaude and his associates[16] stated that a macroscopic classification is of little value and presented a microscopic classification Mahorner and Mattson[11] gave an excellent pathogenetic classification as follows

- A Cysts resulting from defective development
  - 1 Cysts in infants
  - 2 Polycystic disease
  - 3 Lindau's disease
  - 4 Dermoid cysts
  - 5 Inclusion cysts
- B Pseudocysts
  - 1 Traumatic
  - 2 Inflammatory
- C Retention cysts
  - 1 Calculi
  - 2 Annular scar formation
- D Neoplastic cysts
  - 1 Cystadenoma
  - 2 Cystadenocarcinoma
  - 3 Teratomatous
- E Cysts caused by parasites

We feel that, for the surgeon a simple working classification should be devised which provides criteria indicating the proper sur gical procedure to follow. We suggest the following classification:

- A. Benign cysts
  - 1. Pseudocysts (most common)
  - 2. Retention cysts (rare)
  - 3. Congenital cysts (rare)
  - 4. Parasitic cysts (very rare)
- B. Neoplastic cysts (all very rare)
  - 1. Cystadenoma
  - 2. Cystadenocarcinoma
  - 3. Teratoma

TREATMENT

The treatment of pancreatic cysts offers three alternatives: (*1*) excision, (*2*) marsupialization and (*3*) internal drainage (cystovisceral anastomosis).

1. *Excision.*—In reviewing the literature, it was interesting to note that excision is almost invariably referred to as the "ideal treatment" for all types of cysts. This statement is usually coupled with a qualification, "not always feasible," "extremely difficult," "high mortality" and "danger to surrounding structures." It seems, then, that the "ideal treatment" is far from ideal.

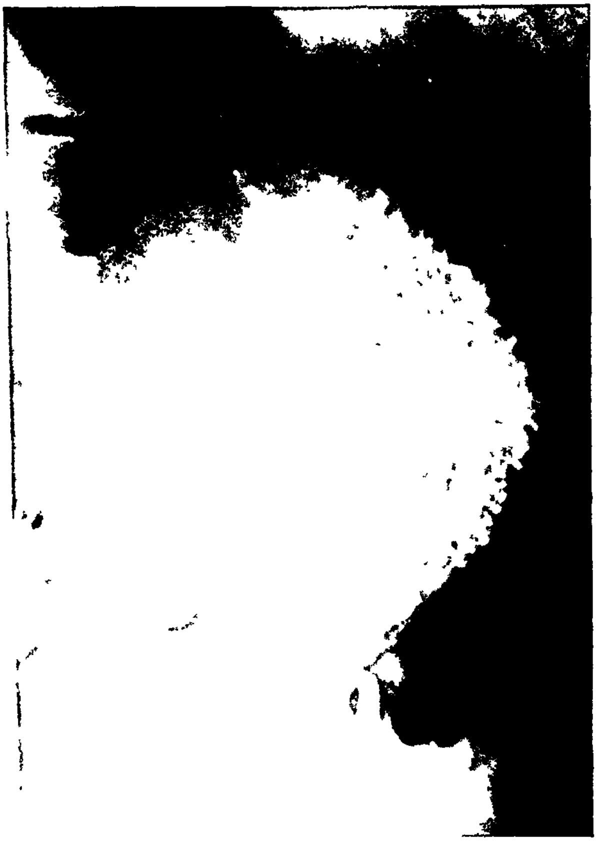

Fig. 4.—Marked displacement of stomach by pancreatic cyst (lateral view).

Excision may be extremely difficult and hazardous owing to the size or the location of the cyst, inflammatory processes and adhesions, and may necessitate removal of the tail and body of the pancreas. Such a procedure may result in diabetes and damage to nearby structures such as the common bile duct, the inferior and superior mesenteric arteries, the splenic vessels, etc. Carter and Slattery[11] reported 2 cases of damage to the common bile duct in a series of 5 cases.

The mortality is formidable. Lahey[12] reported 9 to 25 per cent mortality if excision is successful and up to 55 per cent if excision is unsuccessful. This falls in the category of the "cure being worse than the disease"! In our opinion a procedure with such a high mortality is certainly not justified for benign cysts.

It is time that the idea of excision as the "ideal treatment" for pancreatic cysts be reevaluated and its proper application determined. Excision or partial pancreatectomy should be used only on those cases which are grossly or by frozen section suggestive of malignancy. The only exception is the rare pedunculated cyst which can be excised with relative ease.

2. *Marsupialization.*—Marsupialization or external drainage is not completely satisfactory. This procedure may result in a draining fistula which will take weeks to years to heal. This is particularly true in the epithelially-lined cysts. The draining fistula may result in skin erosion, infection, disturbed electrolyte balance and nutrition and general debilitation.

Attempts have been made to obliterate fistulas by various caustics, roentgen rays, radium, dietetic regimes, prayer, etc. The number and diversity of the methods used are mute testimony to the lesions' resistance to healing. In desperation, in some cases, attempts are made to dissect the fistulous tract and anastomose it to the intestinal tract. It would be more logical to perform a cystovisceral anastomosis in the first place!

The present day use of marsupialization is justified only when circumstances offer no alternative.

3 *Internal drainage (cystovisceral anastomosis)*—We believe that internal drainage is the method of choice for all benign cysts. Internal drainage was first reported by Jedlicka[13] in 1923. In 1929, Jurasz[14] used a transgastric approach and Kirschner[15] a transduodenal approach. Although these and subsequent reports from abroad have been favorable, internal drainage in the United States has not reached the acceptance or popularity of marsupialization or excision.

It is the false conception of many that the anastomosed cyst forms an outpocketing of the intestinal tract which is in danger of contamination by food, bile and duodenal and gastric secretions. It is assumed that such accumulations could then lead to infection, necrosis, hemorrhage or acute pancreatitis. Kunc[16] stated that this fear is more theoretical than practical. He noted no major disturbances when the cyst was opened into the stomach or the duodenum. He stated that no reflux has been proved roentgenologically, nor has there been any evidence of infection or inflammation. Kunc advised a primary anastomosis with the stomach or the duodenum as the operation of choice. Other authors prefer a cystojejunostomy with a jejunojejunostomy to avoid contamination of the cyst.[17]

Pessagno and Shafer[18] have found the results of internal drainage good and do not fear the action of digestive juices on the pancreatic floor. They do not regard the procedure as curative, however, since there is no provision for obliteration of the cavity. This is not a valid criticism. The pseudocyst when drained immediately collapses and owing to the nature of its lining, soon obliterates itself.[19] The epithelium lined cyst also collapses but it may continue to secrete. If drained internally it provides no disturbance and can be likened to an accessory pancreatic duct.

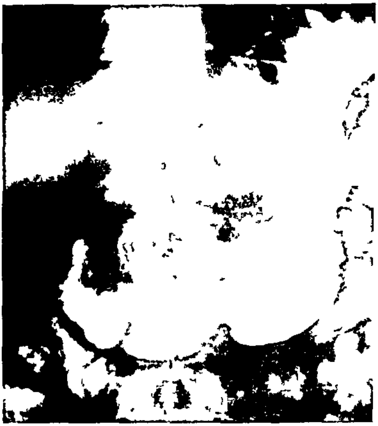

Fig 3—AP view three months after operation. Stomach within normal limits.

The type of internal drainage chosen depends on the location of the cyst. After a study of the anatomic relations of pancreatic cysts it is seen in the majority of cases that somewhere in their course of presentation they are in intimate relation with the posterior wall of the stomach. Also, owing to the inflammatory processes usually present the cysts are adherent to the posterior wall of the stomach in the lesser sac. This fact obviates the need for a cystogastric suture line except for hemostatic purposes.

We are therefore of the opinion that the operation of choice in the majority of cases is a transgastric pancreatocystogastrostomy. This complicated name represents a simple satisfactory and safe operation. For those few cysts which are not in intimate relation to the stomach (those presenting in the transverse mesocolon or below it) cystoduodenostomy or cystojejunostomy becomes the method of choice. These procedures however are accompanied by greater risk owing to technical difficulties in performing such anastomoses and because these anastomoses lie free in the greater peritoneal cavity.

TECHNIC OF TRANSGASTRIC PANCREATOCYSTOGASTROSTOMY

Under suitable anesthesia the abdomen is opened. The abdominal cavity is explored. If the transgastric approach is indicated, as is usually the case, guy sutures are placed in the midportion of the anterior wall of the stomach. A transverse incision is made and the guy sutures are used as retractors. Owing to the anterior displacement of

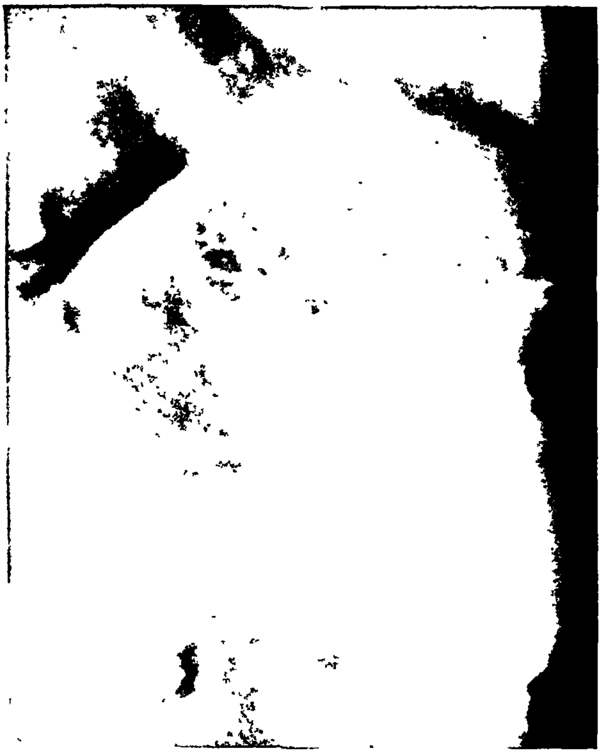

Fig. 4.—Lateral view three months after operation. Stomach within normal limits.

the stomach by the cyst, the posterior wall of the omach presents itself in the opening. The cyst is lpated through the gastrostomy wound, and the ite for the second opening is selected. Four guy sutures are placed through and through the posterior wall of the stomach and the adherent cyst. A large trocar is thrust through this area, and the cyst is aspirated. (This material may be saved for cell study.)

The trocar is withdrawn and, with tension on the guy sutures, the opening is enlarged to about 4 cm. A palpating index finger is now inserted and the wall of the cyst cavity carefully explored. A biopsy specimen, if advisable, may be obtained at this time. (If the rare malignant cyst is diagnosed, the feasibility of radical excision is considered. If the risk is deemed too great or the lesion considered inoperable, internal drainage, as stated, becomes the palliative procedure of choice.) If benignity is assured, the cystogastrostomy opening is ringed with interrupted gastrointestinal sutures to insure hemostasis. The possible purse-stringing effect of the continuous suture is avoided. Next, the anterior gastrostomy wound is closed, and the laparotomy is carried on to completion. No special postoperative care is needed other than Wangensteen suction for a day or so.

REPORT OF A CASE

A 36-year-old white man was seen July 23, 1947, complaining of sharp pains in the right upper abdominal quadrant of three days' duration and slight jaundice. A gallbladder series revealed a poorly functioning gallbladder but no calculi. A cholecystectomy was done. The patient made a good recovery.

He did fairly well for the next three and one-half months, after which (on November 13) severe epigastric cramping pains and distention developed. The pain was worse in the right upper quadrant of the abdomen and radiated to his back. He was hospitalized. A serum amylase test the next day resulted in a value of 120 mg. per hundred cubic centimeters and rose to 161 mg. in the next twenty-four hours. A flat plate of the abdomen revealed no abnormalities. A diagnosis of acute pancreatitis was made. Laparotomy, performed on November 15, revealed a lesser peritoneal sac filled with serosanguinous fluid and an enlarged, tense pancreas. There was some fat necrosis in the mesocolon. The common bile duct was free of stones.

The lesser sac was drained through the foramen of Winslow and through the gastrocolic ligament. The patient was discharged on November 27, after a difficult postoperative course.

He was readmitted on December 25 with a complaint of constant epigastric pain, anorexia and loss of weight since his previous discharge. In the past twenty-four hours the pain had become so severe that he was able to retain only fluids. He complained of distention in the upper part of the abdomen.

Physical examination revealed the patient to be thin and chronically ill. He had a visible, palpable, smooth, tense epigastric mass, particularly tender on the right.

Laboratory tests revealed an essentially normal blood count. The urine gave a 3 plus reaction for albumin. It contained granular and hyaline casts,

Gastrointestinal roentgenograms taken on December 26 showed a mass in the region of the tail of the pancreas, possibly a cyst. There was partial obstruction of the third portion of the duodenum, possibly secondary to a surrounding inflammatory process, perhaps in the pancreas.

Operation was done on Jan. 9, 1948. A large *pseudocyst of the pancreas was observed, occupying the lesser sac and displacing the stomach.* Transgastric pancreatocystogastrostomy was done according to the technic previously described.

The postoperative course was smooth and without incident. A follow-up gastrointestinal series on January 22 showed almost complete disappearance of the evidence of a soft tissue mass in the tail of the pancreas. A fistula of the posterior wall of the stomach was seen but there was no evidence of barium in the cyst. A small amount of air was present in the cyst. The deformity of the duodenum was no longer evident. Another gastrointestinal series (April 5) showed the upper gastrointestinal tract to be within normal limits. There was only slight fixation of the stomach in the region of the previously existing stoma. The soft tissue mass near the tail of the pancreas had completely disappeared. There was no evidence of barium or air in the region of the pancreas.

The patient has remained well to date.

SUMMARY AND CONCLUSIONS

1 Pancreatic cysts are discussed and the literature reviewed.

2 A simple, working classification of pancreatic cysts for the surgeon is presented which provides criteria indicating the proper surgical procedure to follow.

3 The different surgical procedures are discussed and reevaluated. Transgastric pancreatocystogastrostomy is stressed as the surgical procedure of choice for all benign cysts in the retrogastric position. Excision or partial pancreatectomy should be reserved for neoplastic cysts. Marsupialization is justifiable only when there is no other alternative.

4 The technic of transgastric pancreatocystogastrostomy is described.

5 A case in point is presented, in which this treatment was successfully employed.

Although used on a few occasions abroad,[20] this method of internal drainage has not been sufficiently stressed in the United States. A search of the literature for the past three decades reveals only 1 case of its use by an American surgeon, and that inadvertently.[21] Conclusions from this study indicate that the transgastric technic becomes the method of choice for the vast majority of benign cysts of the pancreas.

RESUMÉ

1 La discussion porte sur les kystes pancreatiques et on passe en revue des articles parus à ce sujet.

2 On presente une simple classification des procédés employes, pour les kystes pancreatiques, par le chirurgien, qui fournit des crytères indiquant le procede chirurgical approprié qu'il convient de suivre.

3 Les différents procedés chirurgicaux sont discutés et réconsidérés. La pancréatocystogastrostomie transgastrique est indiquée comme etant vraîment le procédé de choix pour tous les kystes benins dans la position retrogastrique. L'excision ou la pancreatectomie partielle doit etre reservée pour le kyste neoplasique. On ne peut guere justifier la marsupialisation que lorsqu'il n'y a pas moyen de faire autrement.

4 On décrit la technique de la pancréatocystogastrostomie.

5 On rapporte un cas typique dans lequel ces traitements furent employes avec succès.

Quoi qu'elle soit employee a l'etranger dans quelques cas,[20] cette methode de drainage interne n'a pas été suffisamment mise en relief dans les Etats Unis. En recherchant dans la littérature durant les trois decades passées on trouve seulement un cas ou elle a ete employee par un chirurgien americain et encore tout a fait par hasard.[21] Les conclusions de ces etudes montrent que la technique transgastrique est la méthode de choix pour la grande majorite des kystes benins du pancréas.

RESUMEN Y CONCLUSIONES

1 Se estudian los quistes pancreáticos pasando revista a la literatura médica sobre los mismos.

2 Proponen los autores una clasificación sencilla y práctica para el cirujano de los quistes pancreáticos que le permite decidir la técnica quirúrgica a adoptar.

3 Se analizan y evaluan los diferentes metodos quirúrgicos pero el procedimiento preferible para todos los quistes benignos en posición retrogástrica es la pancreatocistogastrostomía transgástrica, debiendo reservarse la extirpación o pancreatectomía parcial para los quistes neoplásicos. Solamente está justificada la marsupialización cuando no existe otra alternativa.

4 Se describe la técnica de la pancreatocistogastrostomía transgástrica.

5 Se describe un caso en el que se aplicó satisfactoriamente este tratamiento.

Aunque se ha usado en el extranjero en algunos pocos casos este método del drenaje interno no se ha dado a conocer suficientemente

en los Estados Unidos. Una investigación de la literatura durante los últimos treinta años ha revelado un caso en el que se empleó por un cirujano norteamericano, aunque ello fué de un modo casual.

Las conclusiones alcanzadas en este trabajo indican que la técnica transgástrica es el método preferible en la inmensa mayoría de los quistes benignos del páncreas.

RIASSUNTO

1. Passano in rassegna e discutono la letteratura sopra le cisti pancreatiche;

2. Presentano una classificazione molto semplice, ma pratica per il chirurgo, che provvede i criteri per la scelta di un determinato metodo operatorio:

3. Ricordano i diversi metodi operatori. Ritengono che la pancreatocistogastrostomia transgastrica sia il metodo di elezione per le cisti benigne dello spazio retrogastrica. L'escisione o la pancreatectomia parziale dovrebbero essere riservate alle cisti neoplastiche. La marsupializzazione e' giustificabile solo allorquando non esistano altre possibilita':

4. Descrivono la tecnica della pancreatocistogastrostomia:

5. Riportano un caso così operato, con completo successo.

Benche' nella letteratura straniera figurino molti casi così operati, negli S.U. risulta un solo caso negli ultimi 30 anni. Giungono alla conclusione che la tecnica transgastrica e' quella che deve essere prescelta nella maggioranza dei casi di cisti benigne del pancreas.

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Rhinoplasty:

Its Surgical Complications and How to Avoid Them

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ALL who are conversant with rhinoplastic surgery are well aware that at times, even in the most capable hands, the results leave much to be desired. I shall endeavor in this paper to point out some of the more common pitfalls and suggest how they can be avoided and, once they have occurred, how they can be corrected. Every phase of the operation entails particular hazards, and these will be taken up serially.

Preoperative Investigation. One must guard against operating upon a patient who may be incipiently schizophrenic. A slight deformity magnified out of proportion or a delusion creating an imaginary deformity calls for a psychiatric consultation. Rhinoplasty in such cases will not effect a change in personality. There are patients, however, who in spite of a depressive or neurotic state may, on the advice of the psychiatrist, be operated upon with great benefit to their morale and stability. The psychiatrist will decide after he takes inventory of the patients which of them should be selected for operative treatment, eliminating those with possible psychoses. Postoperative psychotherapy may serve as a valuable adjunct in certain cases.

In addition to the obvious preoperative information that has to be obtained, several observations should be made. The texture of the skin should be noted. If the skin is of the rhinophymatous type undue thickening may result postoperatively from hypertrophy and hyperplasia of the sebaceous glands. Large pored skin filled with sebaceous matter is inelastic and will not readily drape itself to the remodeled nose especially about the tip. Prognosis should be guarded and limitations should be pointed out to the prospective patient with nasal skin of this kind. Roentgen therapy instituted one week after the rhinoplasty may have a favorable influence. Previous roentgen therapy as a rule does not contraindicate the operation.

An oily skin also detracts from the success of the operation, as it does not heal well. The quality of the cartilages of the tip should be ascertained by inspection and palpation. Thin flaccid cartilages militate against good remodeling, whereas firm cartilages not only facilitate the shaping of the tip but aid in its maintenance. In my opinion the presence of chronic sinusitis offers no contraindication to the operation. Apparently there is local immunity to organisms that have long been harbored in the sinuses. Thorough nasal cleansing before the operation, supplemented by prophylactic chemotherapy, will provide adequate preparation. After acute infections of the upper part of the respiratory tract an interval of at least two weeks should elapse before rhinoplasty is performed.

The preoperative workup should include study of the patient by means of photographs and casts. These can be charted like a blueprint so that the desired esthetic angles and curves are readily and accurately obtained. Such analysis not only assists in diagnosis and management of the deformity but contributes to the development of esthetic appreciation. It must be emphasized that diagnosis is of great importance toward the success of the operation.

OPERATIVE COMPLICATIONS

1. *Complications Associated with Anesthesia.* The method of anesthetization and sedation contributes much to the smoothness of the operation. I use monocaine 1.5 per cent and epinephrine 1:30,000 (Novocol). Block anesthesia with monocaine and epinephrine is preferable to infiltration as it will produce less edema with less masking of the deformity

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New York

Fig. 1.—Two cases of faulty hump removal. *Left*, bony saddle due to excessive removal of bone and insufficient removal of cartilage. *Right*, convex upper cartilaginous vault in addition to faulty hump removal; excessive projection of inadequately remodeled lip.

during the operation and will minimize swelling and ecchymosis after the operation. Adequate preoperative and supplemental sedation during the operation will do much to keep the most apprehensive patient quiet.

2. *Complications in Uncovering the Nasal Pyramid:* Tiny bumps on the dorsum, areas of pallor, redness or cyanosis, and hypersensitivity to climatic changes may result from an irregular elevation of the subcutaneous tissue and periosteum over the nasal pyramid. This occurs when the plane of separation is made in the muscle layer instead of just above the perichondrium over the cartilaginous portion of the dorsum, and beneath the periosteum of the osseous vault. The periosteum should be elevated as a smooth and even layer, and bare bone should be felt as the elevation takes place. Otherwise the operative site becomes frayed and periosteal thickening may develop.

3. *Complications in Removal of the Osseous Hump:* A bony saddle or an undue prominence near the nasofrontal angle may result from improper removal of the bony hump. Study of the analyzed photograph and cast will help to determine the precise amount of hump to be removed. A bony saddle will result if the saw cuts too low. This can be corrected by reinsertion of part of the hump at the time of operation. Unless this is done, subsequent insertion of an implant will become necessary. Cartilage transplants may also be used but are subject to distortion and absorption. An undue prominence will result at the nasofrontal angle if the upper solid area is not included in the hump removal. In such a contingency the nasal bones can be leveled by judicious use of the heavy scissors, chisel, rasp or biting forceps. Obliteration of the frontonasal angle can be caused by too vigorous use of the rasp. Edema

is manifested early. The traumatic periostitis is soon followed by osteogenic proliferation which eliminates the graceful angle between the nose and the forehead.

The bony hump should be removed at an even level unless the nose presents a bony twist. Under these circumstances to prevent asymmetry the saw is placed obliquely instead of horizontally as it cuts through the hump, removing more from the broad concave than from the narrow convex side of the deviation. The two bones are thus equalized in size so that after fracture and shifting of the frontal processes of the maxillae the bones meet in the midline.

One not infrequently encounters an unduly wide nasal bridge associated with irregularity of the dorsum. This sequela arises from improper use of the chisel in breaking the spring of the solid block of bone at the nasofrontal angle prior to the mesial shifting of the nasal pyramid. It can be avoided by engaging the chisel close to and parallel with the septum and advancing the instrument in this plane to the nasofrontal articulation. If the instrument slips out of the plane and cuts obliquely through the body of the nasal bones, shifting of the pyramid must take place below the chisel cut, leaving the root of the nose immobile and broad and the mobile segment depressed.

A wide bridge will often result from outfracturing of the frontal processes, as the bones may be dislocated in the maneuver. Upon mesial displacement after osteotomy, some soft tissue caught between the outfractured bones causes them to assume an abnormally wide position. This may be avoided by placing the chisel below the level of the nasal bones during this maneuver. Occasionally, in old unreduced fractures with overlapping, the outfracture may become necessary before the nasal bones can be mobilized. It is important in making the outward fracture that the chisel be aligned along the entire free margin of the bone and that the pressure exerted be uniform to avoid comminution of the caudal part of the nasal pyramid where the bones are weakest.

At times a dorsal projection of the septum may become apparent after removal of the hump and mobilization of the nasal pyramid, and with the subsidence of edema the sharp edge of the septum will project as a thin vertical ridge between the nasal bones. This can be avoided at the time of operation by rasping down the projecting portion. Unless this is done a small secondary operation will be necessary for removal of the projection.

4. *Complications in Reduction of the Cartilaginous Part of the Dorsum and the Upper Lateral Cartilages.* Depressions, irregularities and undue rounding of the middle cartilaginous vault may follow an improper removal of the cartilaginous portion of the dorsum. After the bony hump has been sawed through, the button knife is inserted beneath it and sectioning is continued in the same plane downward to the end of the septum. Tilting of the knife will produce a break with elevations or depressions along the profile line. It is equally important that the upper lateral cartilages be trimmed to the new height and length of the septum, otherwise their extensions over the midline will fill in with granulation tissue and cause the formation of an undesirable lower dorsal convexity. A roundness in this area may also be brought about by undue thickness of the overlying skin. In such cases the cartilaginous portion of the dorsum should be made to incline slightly lower than the newly

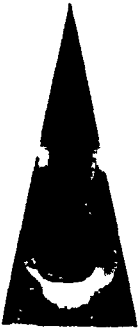


Fig. 2.—Anterior view. Note depressed right lateral nasal wall due to faulty osteotomy, fracture occurs below nasofrontal articulation because of failure to break spring of solid block of bone at root of nose.

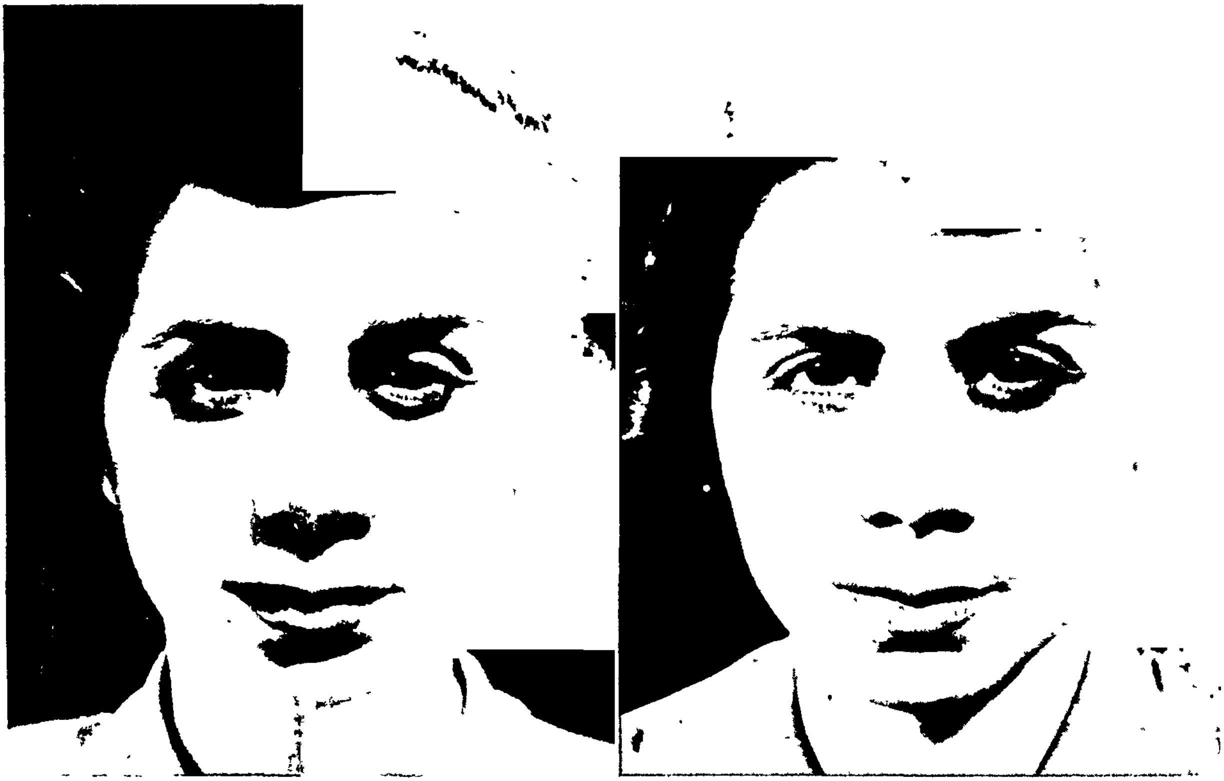


Fig. 3.—*Left*, depression on left of bridge due to absence of left nasal bone, removal at rhinoplasty (confirmed by roentgenogram). *Right*, result of correction by filling in defect with cartilage.

formed profile line, in order to accommodate and compensate for such thickening. Should this occur, a secondary operation becomes necessary for removal of more septum and of the redundant scar tissue that fills the subcutaneous space.

Irregularities of the dorsum may also be due to incompletely removed cartilaginous fragments. To avoid this sequela, frequent inspection and cleansing is necessary when it is suspected that fragments have been left in the dorsal space. A unilateral or bilateral pinched-in appearance of the nose may result from an indiscreet removal of the upper lateral cartilages. Occasionally the subsequent cicatrization between the septum and the remains of the cartilage produces synechiae and interferes with nasal respiration.

A deformed nose associated with a deviated septum introduces additional problems in rhinoplasty, and unless the septum is given consideration even the most technically executed rhinoplasty may fail to give the desired result. Deviations of long standing, especially those dating back to childhood, in addition to buckling or dislocations of the septum, are frequently associated with fibrotic, thickened, atrophied, or adherent lateral cartilages. To restore these structures to normal contour is ofen a difficult matter. The septum must be treated simultaneously with the rhinoplasty if its distortion lies in front of an imaginary line running from the nasal spine of the frontal bone to the nasal spine of the maxilla; if behind this line, it can be resected before, during or after the rhinoplasty. It is my practice in most cases to perform the two procedures at the same sitting, the submucous resection and the rhinoplasty. Enough of the dorsal cartilage is then left so that it can be trimmed down to the amount necessary for support of the bridge after the hump has been removed.

For marked deviations of the cartilaginous portion of the dorsum accompanied by extreme deviation of the septum I sometimes remove the entire septum and reinsert the material in the form of a graft This not only corrects the deflection and elevates the dorsum but materially improves nasal physiologic function The management of the reconstructed septum requires good surgical technic and judgment Should stability of the nose become apparent the immediate dorsal and columellar implantation of cartilage is advised

5 *Complications of Osteotomy* A broad flat dorsum a simulated deviation or a steplike depression or ridge may result from an improperly performed osteotomy If, after the hump has been removed, the flat triangular gap remaining between the nasal bones is not obliterated by a mesial displacement of the frontal processes of the maxillae, it fills in with fibrous tissue, which becomes calcified and results in a broad, flat unsightly dorsum In the performance of the osteotomy great care should be taken to avoid a greenstick fracture of the frontal processes, with their tendency to spring back to their original positions This deformity can be overcome only by breaking the spring of the nasal arch and shifting the walls medially

A simulated deviation of the nose may result from the approximation of asymmetric fragments after an osteotomy performed at unequal levels A steplike ridge along the line of osteotomy may result from a depression of the completely fractured segment Should this occur the depressed fragment must be elevated and held in the proper position by packing until it becomes fixed The occurrence of a ridge may also result from osteotomy performed at a too anterior level Irregular lateral ridges may be the result of comminuted fractures arising from improperly applied digital pressure A proper osteotomy and properly applied digital pressure will also do much to minimize postoperative edema and ecchymosis An audible unmistakable click an easily movable nasal pyramid and an even obliteration of the dorsal gap indicate a satisfactory osteotomy

6 *Complications in Shortening* One of the most common errors arising from improper shortening is a retracted columella This is due to an excessive removal of the membranous septum and can be avoided by making the transfixion close to the caudal margin of the septum A retracted base results from excessive removal of septal cartilage the mesial crura being drawn in when they are reattached to the shortened septum Correction is best accomplished by a columellar implant

Another common error is failure to reduce properly the hanging septum, which is caused rather by excessive width of the mesial crura than by lengthening of the septal cartilage

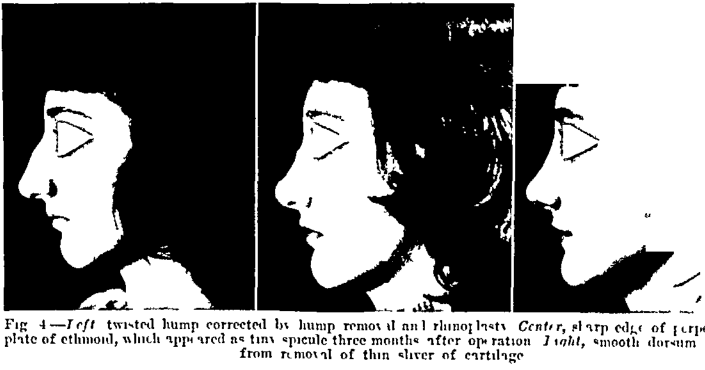


Fig 4—*Left* twisted hump corrected by hump removal and rhinoplasty *Center,* sharp edge of perpendicular plate of ethmoid, which appeared as tiny spicule three months after operation *Right,* smooth dorsum resulting from removal of thin sliver of cartilage

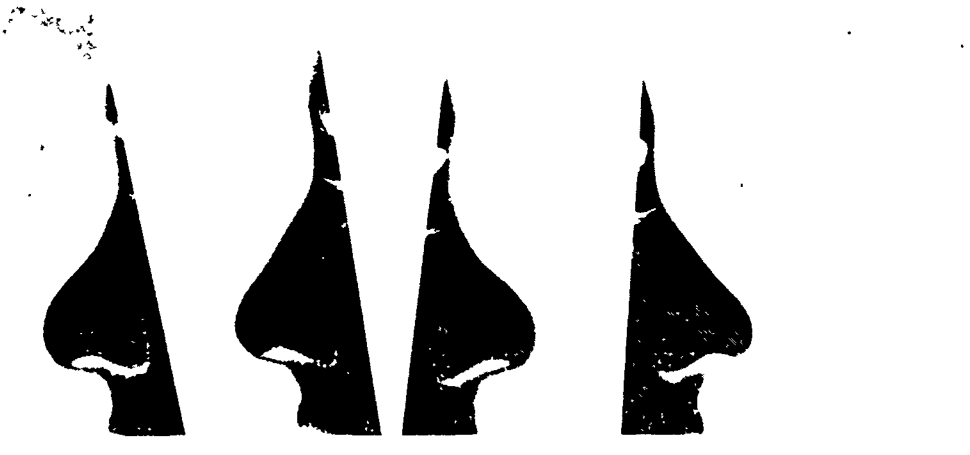


Fig. 5.—Lateral views of low cartilaginous hump and result following adequate trimming of septum and upper lateral cartilages.

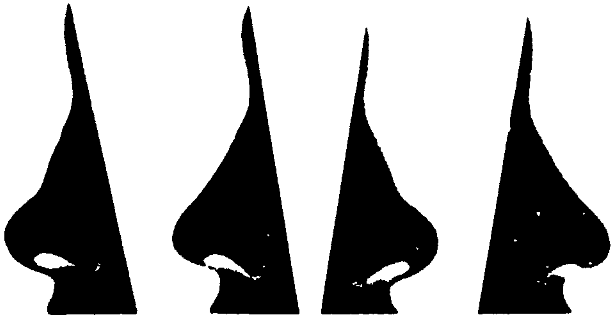


Fig. 6.—Cartilaginous saddle due to excessive removal of anterior inferior end of septum, corrected by septal cartilage implant.

Here, in spite of proper shortening of the septal cartilage, the projection of the mesial crura gives the impression of elongation. To eliminate this error, the septum and mesial crura must be independently reduced.

7. *Complications in Modeling of the Lobule:* The unfortunate oddities resulting from flaws in diagnosis and technic occur most frequently in this conspicuous region. Uneven, irregular, displaced, angulated, punched-in, scarred or collapsed nostrils are sequelae not infrequently seen. It is essential in the majority of instances to reshape the tip and alae to harmonize with the newly formed nose. Unless this is done, the nose has an unnatural disproportionate appearance. Diagnosis of the great variety of malformations of the lobule before surgical intervention is important. Some of the problems encountered are simple and common, others difficult and unusual: e.g., simple reduction in size, lengthening of a short columella at the expense of the lip, introduction of a strut where the cartilaginous support is missing, correction of an improper alar flare, readjust-

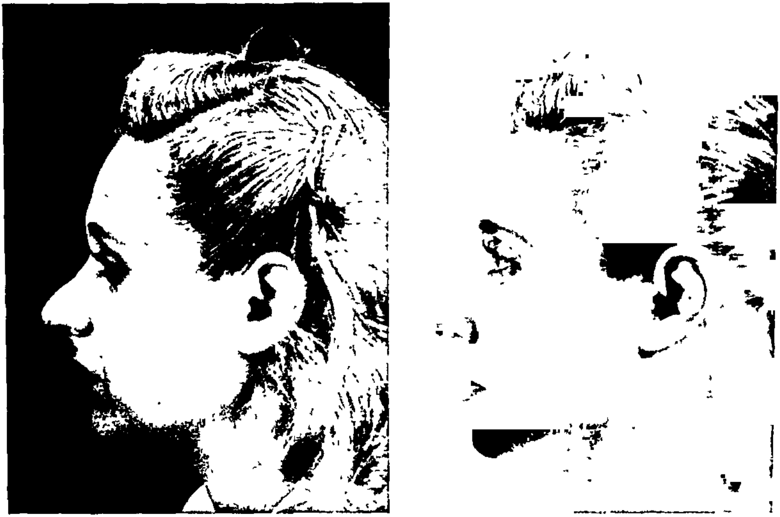


Fig. 7.—*Left,* result of faulty rhinoplasty. Note persisting dorsal convexity. *Right,* result following adequate trimming of septum, upper and lower lateral cartilages and columella

ment of the dislocated lower lateral cartilages into normal position and swinging in of atrophied lower lateral cartilages

In operating on the tip, great care must be taken in delivery of the cartilages if function is to be preserved The undermining must be in the subperichondrial plane, separating the alar cartilages from the subcutaneous tissue without fraying the overlying thin muscle layer. Improper separation may lead to pitting or ridges and result in an artificial, expressionless nose. Cartilaginous segments of equal shape and size should be excised from both sides for a symmetric reduction. Removal of too much cartilage may cause alar collapse. A sacrifice of vestibular skin, with the inevitable cicatrization that results, will lead to distortion, stenosis or even atresia of the nostrils. This can be corrected only by skin grafting and the insertion of cartilaginous implants. Fragmentary removal of cartilages causes pinched-in depressions. These may be filled out by implantation of bits of cartilage. Puncturing of the skin and accidental cuts at the margins of the nostril must be carefully guarded against, as retracted scars follow that are difficult to correct.

POSTOPERATIVE COMPLICATIONS

The incidence of complications arising from rhinoplastic procedures is very small Many surgeons have performed hundreds of operations without sequelae. This is doubtless due to careful planning, application of an atraumatic technic and the prophylactic use of antibiotics.

1. *Infection:* Postoperative acute infections of the upper respiratory tract or acute sinusitis respond to conservative treatment with or without chemotherapy, and their influence on the rhinoplasty is as a rule minimal except for a temporary increase in edema. Even the presence of f[illegible] the nasal chambers seldom alters [illegible] sis. I have seen patients

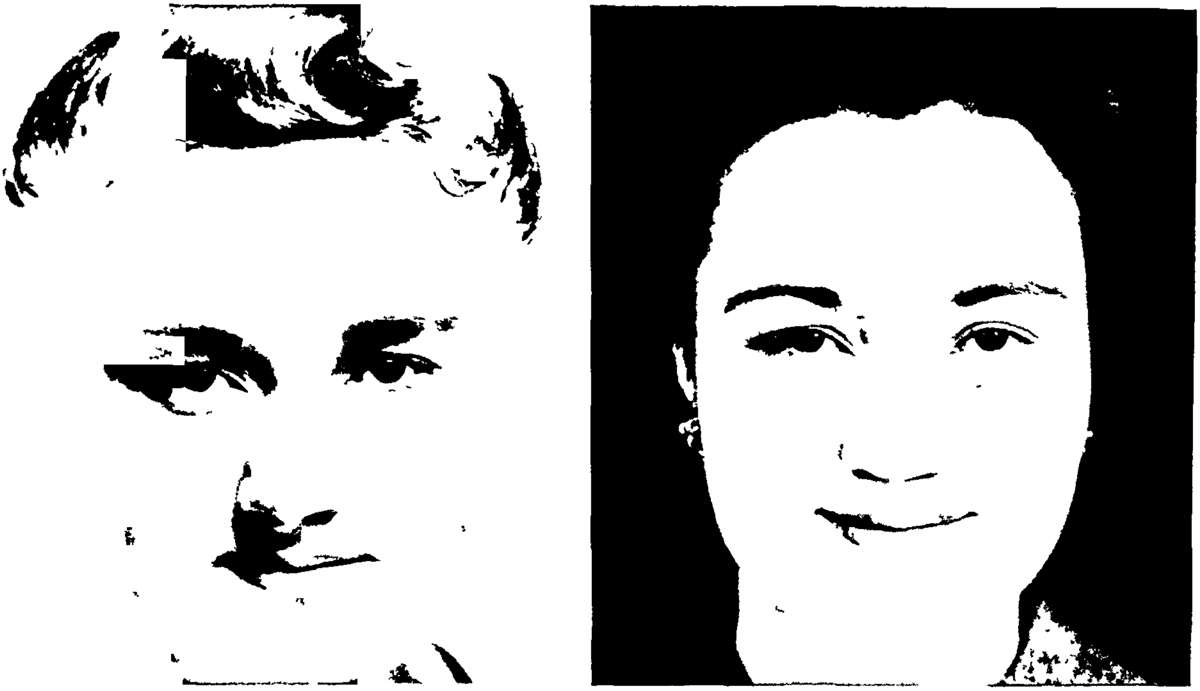


Fig. 8.—Anterior views showing twisted tip (accompanied by nasal obstruction) due to injury in childhood, corrected by simultaneous submucous resection and rhinoplasty.

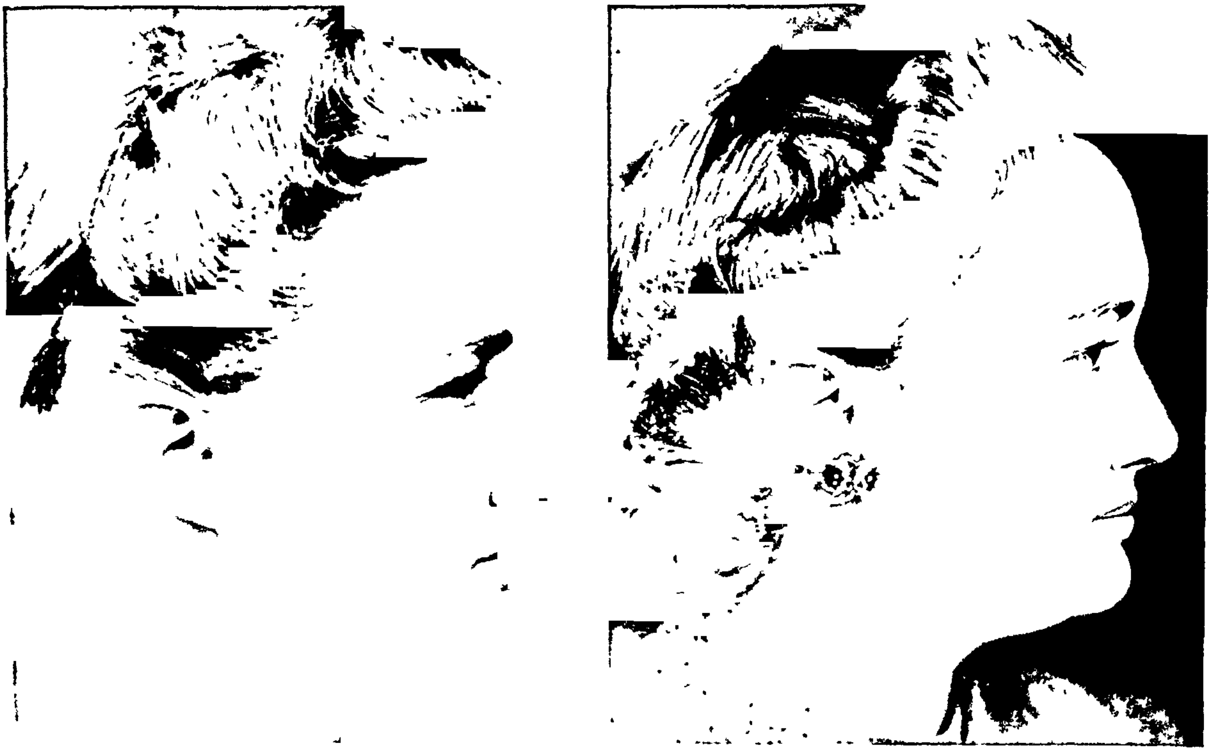


Fig. [illegible]—Lateral views showing small hump and cartilaginous depression, with correction.

in whom grafts have implanted undergo acute suppurative intranasal infections without any untoward effects

Rhinoplastic infections have to be watched carefully Localization should be awaited, as resolution often takes place spontaneously Should suppuration occur, dependent drainage can be obtained through endonasal incisions Those infections that occur at the uppermost parts of the nose are easily approached by small incisions that heal without leaving telltale marks Judgment and deliberation must be exercised before removing grafts that lie in infected areas Frequently, after drainage the infection subsides without altering the graft

2 *Complications Due to Pressure* Occasionally necrosis of the skin or scarring around the tip and along the outer margins of the frontal processes is encountered Excessive or improper pressure of the skin by splints or adhesive tape is the usual cause Although these appliances are essential to keep the newly shaped parts in proper position to prevent edema and hematoma formation an excess of pressure can shut off the blood supply and lead to tissue destruction Should inspection of the skin twenty four to forty eight hours after operation disclose ischemia or cyanosis all pressure must be removed

3 *Complications Associated with Sutures* Localized infections about the base of the nose appearing twelve to fourteen days after rhinoplasty are usually due to inadvertently retained parts of sutures I recently saw a patient who had had several operations for infections around the tip of the nose following a rhinoplasty The infection persisted, and examination revealed a fistula draining from the mesial crus I extracted the knot of a black silk suture which had remained buried in the tissue between the upper ends of the mesial crura The patient recovered rapidly An abscess of the septum following rhinoplasty in which a black silk suture was found was also brought to my attention A long thread left behind the knot is safer than a suture cut short as the supervening edema may conceal the suture and make it difficult to grasp when it has to be removed

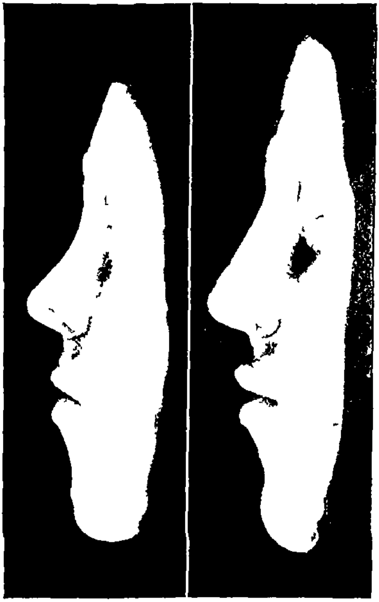


Fig 10 —Cast showing (*left*) saddle nose deformity following simultaneous rhinoplasty and septal reconstruction and (*right*) result of correction by nasal implant

SUMMARY

A review of the common complications that may be encountered in performing a rhinoplasty is presented The complications are taken up serially Consideration is given to each step of the operation and suggestions are offered as to how to avoid and correct errors in technic Preoperative planning not only assists in the diagnosis of the nasal deformity but contributes to the esthetic result desired

The physiologic structure and function of the nose must be constantly kept in mind Sacrifice of vestibular skin with subsequent cicatrization leads to distortion and interference with nasal respiration Excessive removal of cartilage will cause alar distortion and nasal obstruction The removal of the hump must be done precisely, if the hump is inadequately

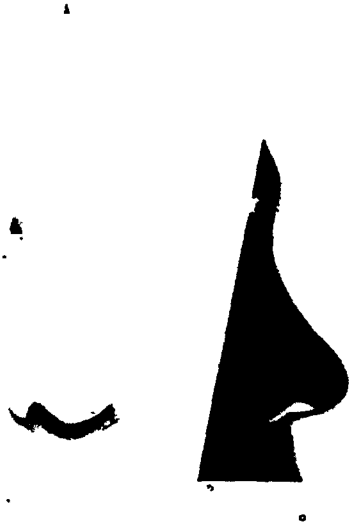


Fig. 11.—*Left*, anterior view showing wide dorsum due to faulty osteotomy and failure to shift lateral walls mesially. *Right*, lateral view showing minor saddle due to excessive hump removal.

removed, not only does the excessive use of the rasp invite infection but the resultant periostitis produces irregularity of the dorsum and may obliterate the desirable angle between the nose and the forehead. Excessive hump removal produces a bony saddle; immediate correction is necessary. Improper use of the chisel in breaking the nasofrontal articulation or outfracturing of the frontal processes will produce a wide nasal bridge. Irregularities of the dorsum are also caused by an uneven elevation of the skin and periosteum over the nasal pyramid when the proper plane is not entered; incompletely removed fragments of cartilage and debris also contribute. Upper lateral cartilages must be removed so that they do not overlap the septum; on the other hand, excessive removal will result in cicatrization of the septum and cartilage with production of a pinched-in nose as well as interference with nasal breathing. *Frequently a plastic operation*

[illegible] by excessive removal of septum in combined submucous resection and [illegible]. This was corrected by insertion of a columella strut.

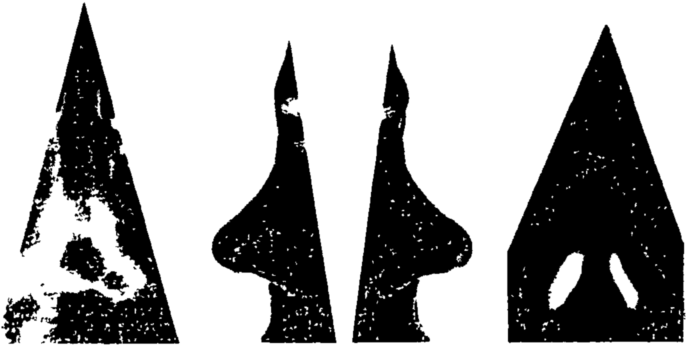


Fig. 13.—*Left,* anterior view showing (1) saddle of cartilaginous dorsum due to excessive removal of upper lateral cartilages and septum; collapse of alar walls due to faulty trimming of lower lateral cartilages, and *tremendous retraction of columella. Center, profile views showing indentations on either side of lobule. Right,* basal view showing asymmetry of nostrils. Intranasal examination showed narrowed vestibules, especially on left side, due to cicatrization between septum, mesial crura and remaining vestibular skin, most of which had been sacrificed.

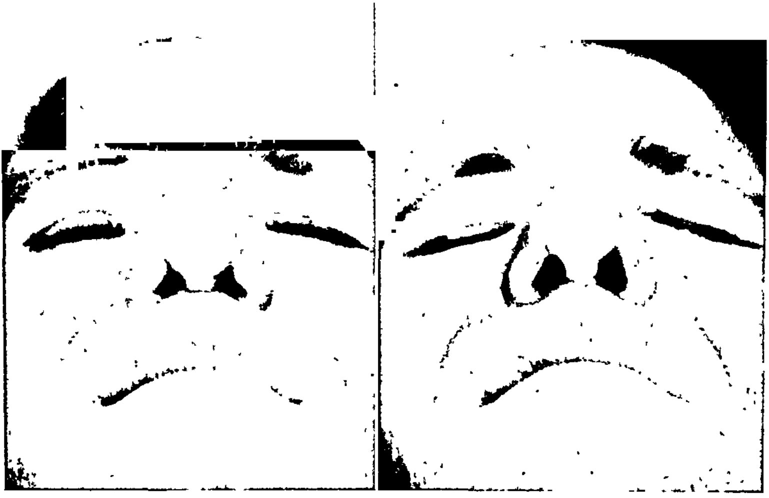


Fig. 14.—*Left,* vestibular atresia due to excessive removal of lower lateral cartilages and cicatrization between septum, mesial crura and remaining vestibular skin, causing marked nasal obstruction. *Right,* result following removal of scar tissue and skin grafting of vestibule.

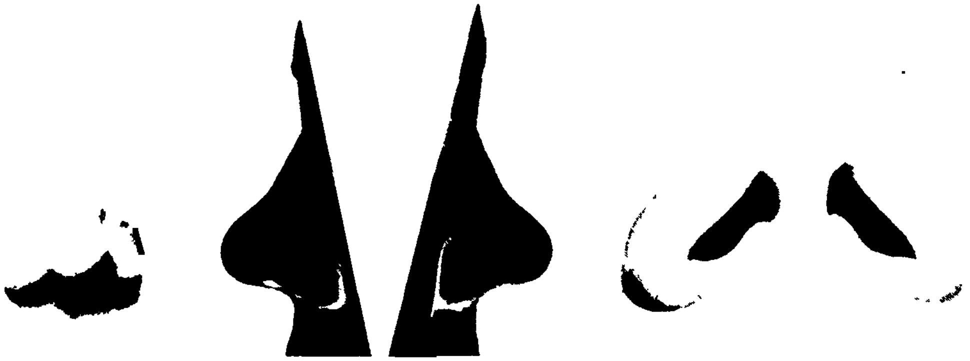


Fig. 15.—*Left*, anterior view showing broad dorsum due to hump removal without medial mobilization of lateral walls of nose; alar clefts due to excessive removal of lower lateral cartilages and vestibular skin, followed by adhesion causing stenosis of nares and interference with respiration; retracted columella. *Center*, right and left lateral views showing alar clefts and retracted columella. *Right*, basal view showing distortion of nares and pinched lobule.

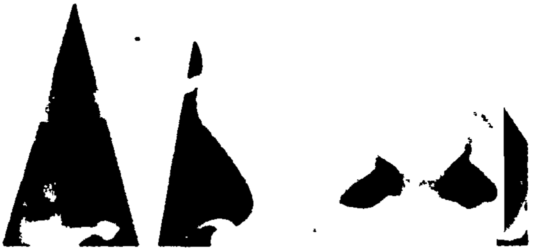


Fig. 16.—*Left*, anterior view of broad dorsum due to hump removal without osteotomy; right alar collapse with vestibular atresia due to removal of skin and lower lateral cartilages; deviated dorsum caused by scar contracture. *Center*, lateral view showing persisting convexity and collapse of alar wall. *Right*, basal view showing asymmetric nostrils with alar clefts.

on the septum has to be performed in conjunction with the rhinoplasty. Complete removal of the septum and its reinsertion as a graft not only produces excellent cosmetic results but improves nasal obstruction The management of the lobule is complicated by the diversity of problems encountered The details are many: the complications arise chiefly from improper undermining and indiscriminate removal of vestibular skin and cartilage Various [illegible] follow which are corrected by skin grafts and [illegible] transplants

Postoperative complications are rare but should be handled conservatively. Prophylactic chemotherapy is especially indicated in cases of excessive tissue trauma and in tissue transplants.

RÉSUMÉ

On passe en revue les complications banales que l'on peut rencontrer au cours d'une rhinoplastie; elles sont exposées sérieusement. On examine chaque stade de l'opération et on fait des suggestions sur la façon d'éviter et de corriger des erreurs de technique. Les soins préopératoires non seulement aident à faire le diagnostic de la déformation nasale, mais contribuent également à obtenir le résultat esthétique cherché.

On doit constamment avoir à l'esprit la structure physiologique et le comportement fonctionnel du nez. L'enlèvement de la peau vestibulaire et la cicatrisation qui suit doit provoquer de la déformation et des troubles de la respiration nasale. L'ablation trop étendue des cartilages sera aussi la cause des déformations et obstructions nasales. L'ablation de la bosse doit être exécutée avec précision. Si la bosse est enlevée d'une façon insuffisante, non seulement l'emploi excessif de la râpe est une invite à l'infection, mais la périostite qui en résulte donne lieu à la production d'irrégular-

ités sur l'arête du nez et peut combler l'angle nécessaire à l'union du nez et du front Une ablation excessive de la bosse a pour résultat une selle osseuse, il est nécessaire de la corriger Un emploi intempestif du ciseau en endommageant l'articulation nasofrontale ou en fracturant les parties frontales, produira un large pont nasal Les irrégularités de l'arête sont aussi produites par une élévation irrégulière de la peau et du périoste sur la pyramide nasale lorsque l'on ne pénetre pas dans l'espace adéquat A cela aussi contribue une ablation incomplète des fragments du cartilage et de ses débris Les cartilages latéraux qui sont au dessus doivent être enlevés de telle facon qu'ils ne dépassent pas la cloison, autrement dit, une ablation excessive donnera comme résultat une cicatrisation de la cloison et du cartilage avec production d'une arête nasale étroite ainsi que des troubles de la respiration nasale Frequemment une opération plastique de la cloison doit être accomplie en même temps que la rhinoplastie L'ablation totale de la cloison et sa réinsertion comme greffe produit non seulement un excellent resultat esthétique mais améliore l'obstruction nasale L'arrangement du lobule est compliquée par la diversité des problèmes rencontrés Il y a beaucoup de détails et les complications surviennent surtout à la suite d'un soulèvement inadapté et de l'ablation inconsidérée de la peau vestibulaire et du cartilage Des déformations variées suivent On peut les corriger par des greffes cutanées et des transplants cartilagineux

Les complications post opératoires sont rares mais doivent être traitées dans un esprit conservateur La chimiothérapie est particuliere ment indiquée dans les cas où il y a eu un traumatisme excessif des tissus ainsi que dans les transplantations de tissu

RESUMEN

El objeto de esta comunicación es presentar un estudio de las complicaciones mas frecuentes que pueden hallarse al hacer una rinoplastia Una vez estudiada paso a paso la intervencion se dan una serie de sugestiones sobre cómo evitar y corregir los errores de técnica El planeamiento preoperatorio de la intervención no solamente ayuda a diagnosticar la deformacion nasal sino que ayuda a obtener el resultado estético deseable

Debe recordarse continuamente la estructura fisiológica y la función de la nariz El sacrificio de la piel del vestibulo nasal con la

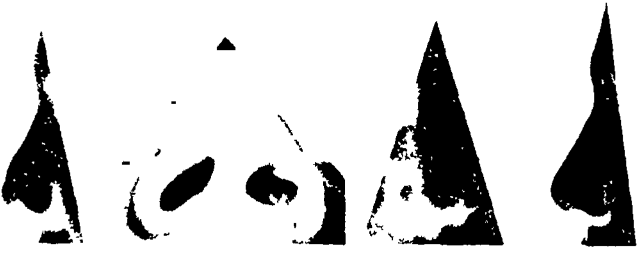
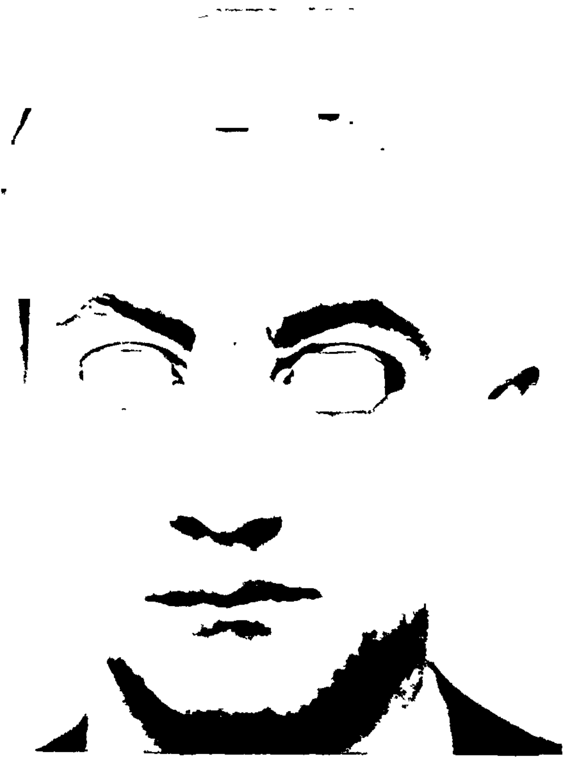


Fig 17—*Left,* lateral view showing simulated depression of tip caused by button and knife skirting anterior inferior end of septal cartilage, cleft ala due to trimming of lower margins of lower lateral cartilages with subsequent cicatrization Absence of normal skeletal support causes skin to sink beneath surface *Left center,* basal view showing cleft ala to better advantage, also retracted columella due either to excessive removal of septal cartilage or to undue sacrifice of membranous portion of septum Oblique columella is caused by sacrifice of vestibular skin, subsequent contracture pulls tip to left side *Right center,* anterior view of cleft *Right,* lateral view showing correction

cicatrización subsiguiente, conduce a una distorsión, e interfiere con la respiración nasal. La extirpación excesiva del cartílago conduciría a resultados similares. La extirpación de la deformación debe hacerse con exactitud, ya que de no hacerse así, no solamente puede determinar una infección si el raspado nasal es excesivo, si no que además, la periostitis resultante produce irregularidades en el dorso de la nariz y puede llegar a obliterar el ángulo externo entre la nariz y la frente. Si la extirpación fuera excesiva se produciría una nariz en silla de montar que requeriría otra intervención quirúrgica. El empleo inexperto del escoplo para romper la articulación nasofrontal, o la fractura de los procesos frontales producirá un puente nasal demasiado amplio. La elevación desigual de la piel y periostio sobre la pirámide nasal cuando no se aborda quirúrgicamente el plano adecuado, produce irregularidades del dorso nasal, a lo que contribuye también la extirpación incompleta de los fragmentos ósteo-cartilaginosos.



[illegible] either side of nose, due to [illegible] splint.

Deben extirparse los cartílagos laterales superiores para que no queden superpuestos sobre el tabique nasal. Por otra parte, si se extirpan en exceso determinan una cicatrización del tabique y del cartílago, produciendo una retracción nasal y dificultando la respiración. Con frecuencia junto con la rinoplastia resulta indispensable una operación plástica sobre el tabique. La extirpación total del tabique y su reinserción en un injerto, no solamente produce excelentes resultados cosméticos, sino que mejora a obstrucción nasal. Se estudian también los problemas de la operación sobre el lóbulo nasal. Ciertas complicaciones nacen de la eliminación inadecuada de la piel y cartílago vestibulares, pudiendo corregirse las dificultades consiguientes mediante injertos cutáneos y transplantaciones cartilaginosas. Las complicaciones postoperatorias son raras, pero deben cuidarse conservadoramente. La quimioterapia profiláctica está especialmente indicada en los casos de excesivo traumatismo tisular y en las transplantaciones de tejidos.

RIASSUNTO

Passa in rassegna le complicazioni piu' comuni che insorgono nell'esecuzione di una plastica nasale. Speciale considerazione viene data ad ogni fase dell'operazione, avanzando opportuni consigli onde evitare e correggere possibili errori di tecnica. Un esatto programma preoperatorio non solo aiuta nel formulare la diagnosi della deformità nasale, ma contribuisce al raggiungimento del risultato estetico desiderato.

Occorre avere sempre in mente la struttura fisiologica e la funzione del naso. Il sacrificio della cute vestibolare, con la successiva cicatrizzazione, conduce a distorsioni ed anomalie nella respirazione nasale. Un'eccessiva rimozione della cartilagine sara' causa di distorsioni e di ostruzione nasale. L'asportazione della gobba nasale deve essere eseguita con esattezza; se l'asportazione non e' sufficiente, la necessita' di un energico raschiamento aprirà non solo la strada ad un'infezione, ma la periostite che ne consegue condurra' ad irregolarita' del dorso del naso e ad una possibile obliterazione dell'angolo desiderato fra il naso e la fronte. Un'escisione troppo generosa della gobba condurra' per converso ad

una sella ossea, che rendera' necessario in'immediata correzione. L'uso non appropriato dello scalpello nel rompere l'articolazione neso-frontale o nel fratturare in eccesso i processi frontali produrra' un ponte nasale troppo largo.

Irregolarita' del dorso possono essere anche dovute ad un'elevazione non uniforme della cute e del periostio sopra la piramide nasale all'orquando un'appropriato piano di clivaggio non viene trovato o seguito: possono contribuire a queste irregolarita' anche frammenti cartilaginei.

Le cartilagini laterali superiori debbono essere rimosse, di modo che non si sovrappongano al setto: un'escisione troppo abbondante potrà condurre, per converso, ad una cicatrizzazione del setto e delle cartilagini, con la creazione di un naso schiacciato e disturbi della respirazione nasale.

All'operazione plastica del naso va spesso associata un' operazione plastica del setto Una completa asportazione del setto, con successivo reimpianto, conduce non solo ad eccellenti risultati cosmetici, ma migliora un'ostruzione nasale.

L'A. passa infine a descrivere il trettamento del lobulo. Possibili complicazioni derivano specialmente da un'asportazione indiscriminata della cute e della cartilagine vestibolare. Ne conseguono deformita' varie, che possono essere corrette da trapianti cutanei e cartilaginei.

Le complicazioni postoperatorie sono rare: debbono essere trattate conservativamente. La chemioterapia profilattica e' particolarmente indicata qualora i tessuti vengano eccessivamente traumatizzati e nei trapianti

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Incision for Exposure of the Gallbladder

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A "PHYSIOLOGIC" incision for exposure of the gallbladder and bile ducts is the basis of this presentation. Originality is not claimed, for the incision is but an adaptation at a particular site of recognized principles used elsewhere. Nor is priority claimed, for it is quite possible that it has been described before, though I have been unable to find it in the textbooks and treatises on operative surgery or in the recent surgical literature to which I have had access. I have found the incision very useful and should like to call it to the attention of other surgeons. I am submitting this description for publication with the hope that some reader may be able to inform me as to the name of its originator and the place of its origin and first description.

Dissatisfaction with the old leads to trial of the new. More than twenty years ago, as a junior intern holding the retractor, I first noted the disadvantages of the traditional upper midline or right paramedian incision. The strong pull on the retractor needed to displace the right upper abdominal wall not only affected the arm of the intern but was likely to damage the patient's liver—the inner end of the retractor blade either lifted up the liver or rubbed on its anterior surface. The surgeon's temper was also affected at times, for, unless the patient's abdominal wall was weak or deeply anesthetized, even vigorous retraction often failed to give consistently good exposure. The result of the struggle was that the patient had both the effects of deep anesthesia and a very sore abdomen to endure next day.

While on leave in America in 1943, I worked for a certain period as an industrial surgeon. At a time when we were sorely pressed for workmen, I had to reject for foundry work (and divert to a lighter job) a man who was a perfect specimen except for a bulge in his right upper abdominal quadrant, which accompanied a well healed scar of a 4-inch (10 cm.) Kocher incision.

As I look back, these seem to be the points of departure in my search for an ideal gallbladder incision. Several stages, however, contributed to the development of the incision presented here.

1. About ten or twelve years ago, operating on a 10-year-old boy in whom, after a relapse of typhoid fever, acute hydrops of the gallbladder had developed, I used a McBurney type muscle-splitting incision (with local anesthesia) placed immediately over the distended and palpable gallbladder. I was impressed with the ease of exposure, the lack of any necessity for vigorous retraction, the fact that no retraction in the direction of the liver was needed, and the rapid healing and strong abdominal wall that resulted despite the necessity for prolonged drainage after the cholecystostomy. I have continued to use this approach when cholecystostomy was clearly indicated before operation, and I recommend it highly.

2. At the same time and thereafter I gradually shifted to the use of the longitudinal-through-skin and transverse-through-rectus-sheath-and-rectus-muscle incision of Sloan and the straight transverse supraumbilical incision (sometimes called the Gurd incision or Sander's incision) for most of my operations in the upper abdominal region, including a number of cholecystectomies. These methods of approach showed that an improved exposure could be gained by cutting the rectus muscle and sheath transversely, and that there was no danger in cutting the muscle if the nerve supply was not damaged and the sheath well repaired. But retraction in the direction of the liver was still needed, even though it did not need to be applied as vigorously as with the longitudinal incision.

However, in 1946, I had a patient scheduled for cholecystostomy, and I exposed the gallbladder by the muscle-splitting approach. Ex-

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ploration of the ducts and cholecystostomy proved to be indicated Extension of the incision across the right rectus muscle and its sheaths gave the necessary additional room and exposure and produced the incision here described, which I have found most satisfactory for cholecystectomy and surgical treatment of the bile ducts The details of technic are shown in the accompanying illustration

TECHNIC

Cutaneous Incision —A curvilinear incision starts from just above the right costal margin at a point immediately over the palpable gall bladder, or, if the organ cannot be felt at a point where the fundus of the gallbladder is expected to lie (This is usually between 1 and 2 inches (2 5 and 5 cm) to the right of the junction of the lateral border of the right rectus muscle with the costal margin) The incision then curves downward and across the abdomen, passing about an inch (2 5 cm) above the umbilicus and ending about the same distance to the left of the midline the latter part of the incision being horizontally transverse

External Oblique Aponeurosis —This layer is split in the direction of its fibers from the costal margin downward and medially, and this splitting is continued across the anterior rectus sheath to the midline still following the direction of the external oblique fibers in that sheath

Internal Oblique Muscle and Sheath —These are cut across in the same direction as the splitting of the external oblique fibers

Rectus Abdominis Muscle —Whether the anterior sheath has been cut across obliquely or transversely will depend on the width of the upper part of the abdomen and therefore on the direction of the external oblique fibers In any case however the right rectus abdominis muscle is cut transversely This is best done with a scalpel cutting across with a series of shallow cuts while the left index finger elevates the muscle away from the posterior sheath This allows pressure to be exerted on the inferior epigastric artery (which may be multiple rather than single) and involves very slight loss of blood while the artery is being doubly clamped, cut and ligated (Note· There is frequently also a small artery at the outer border of the rectus sheath which needs to be clamped)

Posterior Rectus Sheath, Transversalis Muscle and Fascia and Peritoneum —It is most convenient to incise these structures together in the same line as the rest of the incision

Retraction —Because of the cutting of the rectus muscle and the cutting or separation of the other muscles, the wound gapes open This gape can be increased and the exposure improved if a small sandbag or pillow has been placed beneath the right lumbar region before draping the patient The sides of the wound can be held open to the extent desired with a two hook self retaining retractor of the Balfour type

The stomach and the colon will usually be held out of the way by the same means If necessary, however, separate deep retractors can be used for gentle retraction on these organs A flat flexible blade retractor can then be used for internal retraction of the duodenum if necessary

It will thus be seen that there is no retraction necessary in the direction of the liver

Exposure (accompanying illustration, *E*) —The bile ducts in their entire length as well as the gallbladder, are well exposed and a careful dissection can be carried out for either exposure of the common duct or removal of the gallbladder

It is unnecessary here to discuss the technic of cholecystectomy This operation has been well described in a number of recent books and articles, which call attention to the frequency of variability in the arrangement of both cystic artery and bile ducts

Closure (see illustration *F H*) —Before closure is started hemostasis is checked the sponge count made and the sandbag or pillow is removed from under the patient Closure is still easier if the head and neck of the patient are raised and the knees flexed

Peritoneum The peritoneum is closed with a continuous suture of No 40 cotton (or No 30 if there is any tension) The transversalis fascia and muscle and the posterior rectus sheath are also included in this layer in the ordinary case If there is an unusually well developed transversalis muscle, only the fascia is included with the peritoneal suture, and the muscle and its anterior sheath may be approximated with three or four interrupted cotton (No. 40) sutures as a separate layer.

Internal Oblique Muscle: The cut edges of this muscle and its sheath are accurately approximated with several interrupted No. 40 cotton sutures, the line of sutures extending right up to the lateral edge of the rectus sheath.

External Oblique Aponeurosis and Anterior Rectus Sheath: No attempt is made to draw together the cut ends of the rectus muscle, but closure of the rectus sheath is accurately made with interrupted cotton (No. 30) sutures, and sutures of the same type are continued along the aponeurosis up to the costal margin.

Fat and Subcutaneous Fascia: If this layer is very thick, a few tension sutures of cotton (No. 30) are placed through the skin and subcutaneous layer and are tied over a strip of gauze after the placing of the skin sutures.

Skin: Interrupted cotton sutures (No. 40) are used. The end sutures and the one in the center are left long, and these are tied over a small roll of gauze, which covers the suture line. Then another small gauze compress is placed over this and the whole dressing is covered and fastened in place with two strips of adhesive plaster 1½ to 2 inches (3.7 to 5 cm.) wide, which are placed in the same direction as the wound, and extend 2 or 3 inches (5 to 7.5 cm.) beyond the dressing on both sides.

A large dressing is avoided, and no binder is used. One can then easily detect any abnormality in the region of the wound or in the abdomen.

Drainage.—I rarely use drainage after cholecystectomy. If it is indicated, a roll of rubber tissue is used as a drain and is led out at the upper end of the incision, which is usually the most direct and shortest course for it. Occasionally a stab wound is made lateral to the wound if that seems a more direct route for the drain (or for a common duct drainage tube).

Mobilization and Ambulation.—This incision and its closure are admirably suited to early ambulation. The patients move around in bed as soon as they come out of anesthesia, sit up (and usually walk around the bed) about six or eight hours after operation and walk twice on the next day.

SUMMARY

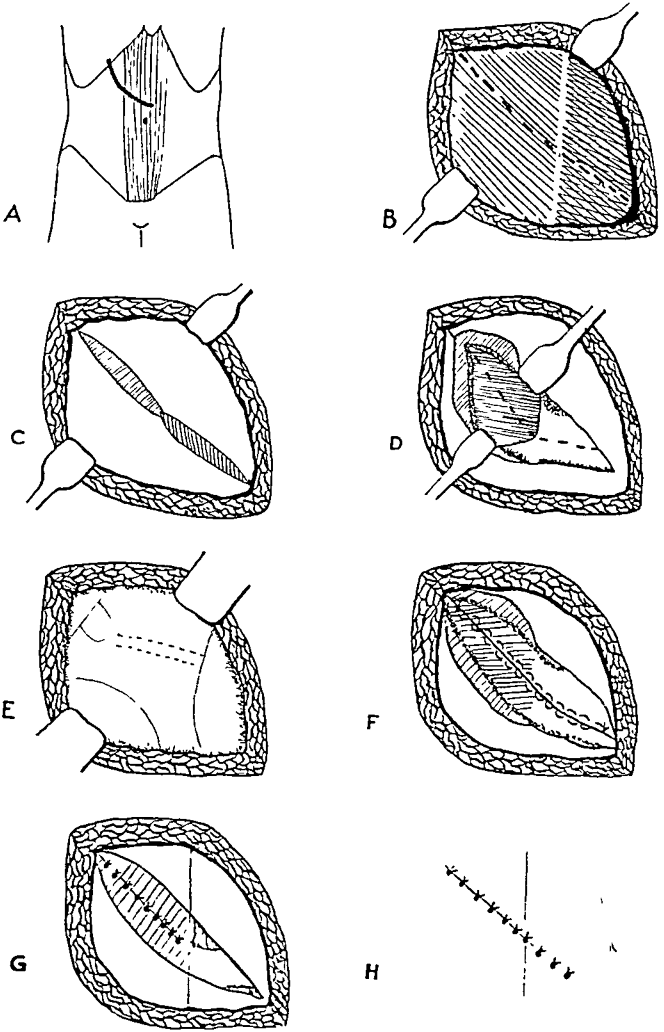
A technical description is given of a "physiologic" incision of the gallbladder. The advantages of this incision are quite evident:

1. It is placed immediately over the parts to be exposed.

2. The wound tends to gape open because of the cutting of the rectus muscle and its sheaths and the cutting or separation of the muscles attached to that sheath. Neither vigorous retraction nor very deep anesthesia is needed.

3. Retraction of the abdominal wall is tangential to the edges of the liver and can be done with a self-retaining retractor. A bent ribbon retractor of the Crile type in the lower angle of the wound can be used to hold the colon or the duodenum out of the field.

''Physiologic'' incision for exposure of gallbladder and bile ducts. *A*, cutaneous incision from just beyond costal border, over gallbladder, to a point about 1 inch (2.5 cm.) to left of midline. *B*, incision in external oblique aponeurosis and muscle, and in anterior rectus sheath, in the direction of the fibers. *C*, incision *B* opened to show internal oblique and rectus muscles. *D*, internal oblique muscle cut across in the line of the previous incision (i.e., perpendicular to its fibers) and rectus muscle cut transversely (i.e., perpendicular to its fibers). See text about precautions. Incision to be made in transversalis muscle, transversalis fascia, peritoneum and posterior rectus sheath is indicated by the dotted line. *E*, exposure of the liver edge, gallbladder, common bile duct (dotted lines), duodenum and transverse colon. Note that there is *no* retraction toward the liver and gallbladder. *F*, closure of peritoneum, transversalis muscle and fascia, and of peritoneum and posterior rectus sheath with continuous suture of No. 40 cotton (No. 30 is occasionally used). *G*, closure of fascial envelope of internal oblique muscle and approximation of muscle edges with interrupted sutures of No. 30 (or No. 40) cotton. *H*, rectus muscle *not* sutured. External oblique aponeurosis and anterior rectus sheath are sutured with interrupted cotton No. 40 (or No. 30) sutures. Sutures of the same type are used for closure of the skin (not shown).


A
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H

4. Any retraction of a low-lying liver that may be necessary is done by gentle retraction of the liver only. The abdominal wall is open up to the costal margin, and no upward abdominal wall retraction is needed.

5. A strong abdominal wall results, which is quite suited to early ambulation and in which there is very little likelihood of herniation if accurate repair of all muscle sheaths is done with fine cotton or silk sutures; for, although the rectus abdominis, internal oblique and transversalis muscles are cut across, there is no damage to the nerve supply and the essential blood supply of these muscles. (The same care in ligation and cutting of the deep epigastric artery just behind or in the rectus muscle must be used, as in all transverse incisions that cut this muscle.)

A trial of this incision is recommended and a report of experiences requested. My own experience has been most satisfactory.

RÉSUMÉ

On fait une description technique de l'incision "physiologique" de la vésicule biliaire. Les avantages de cette incision sont bien évidents.

1. Elle se fait immédiatement sur les parties qui doivent être exposées.

2. L'incision reste spontanément ouverte en raison de la section du muscle droit et de sa gaine et de la section ou de la séparation des muscles qui s'insèrent sur cette gaine. On n'a besoin ni d'une rétraction importante, ni d'une anesthésie très profonde.

3. La rétraction de la paroi abdominale est tangentielle aux bords du foie et peut être réalisée avec un rétracteur auto-statique. Un rétracteur à ruban incurvé du type de Crile peut être employé dans l'angle le plus bas de l'incision pour maintenir le colon ou le duodénum en dehors du champ opératoire.

4. Toute rétraction du foie situé plus bas, qui pourrait être nécessaire, est faite seulement en réclinant prudemment le foie, car la paroi abdominale est ouverte jusqu'au rebord costal et on n'a pas besoin d'avoir un réclinement de la paroi abdominale au-dessus.

5. On obtient ainsi une paroi abdominale forte qui est tout à fait adaptée à une reprise précoce de la marche, et elle a peu de chance d'être favorable à la production de hernies si la réparation minutieuse de toutes les gaines des muscles est effectuée avec des sutures au coton ou à la soie; car, bien que le droit abdominal, l'oblique interne et les muscles transversaux soient incisés, on ne produit aucune lésion dans l'innervation et dans la vascularisation de ces muscles. (On doit faire avec le même soin la ligature de la section de l'artère épigastrique profonde, juste derrièrre ou à l'intérieur du muscle droit, comme dans tous les autres incisions transverses coupant ce muscle.)

Il serait bon d'essayer l'emploi de cette incision et d'en donner les résultats. Ma propre expérience a été des plus satisfaisantes.

RESUMEN

El autor describe técnicamente una incisión fisiológica de la vesícula biliar cuyas ventajas son las siguientes:

1. Se realiza inmediatamente encima de las partes sobre las que se desea operar.

2. Como quiera que la incisión corta el músculo recto y sus vainas, y corta o separa los músculos insertados en dichas vainas, la herida tiende a mantenerse ampliamente abierta. No se necesita usar una retracción intensa, ni tampoco se precisa de una anestesia muy profunda.

3. La retracción de la pared abdominal se realiza tangencialmente a los bordes del hígado, y puede hacerse con un retractor que se mantiene por sí solo en posición. Para separar el colon o el duodeno del campo operatorio puede emplearse un retractor de cinta del tipo Crile, situándolo en el ángulo inferior de la herida.

4. Puede realizarse cualquier retracción que sea necesaria en el hígado cuando éste se halla en una posición baja, haciéndola suavemente sobre el hígado mismo, ya que la pared abdominal está abierta hasta el reborde abdominal, por lo que no se necesita retraer hacia arriba la pared abdominal.

5. Como resultado de la operación se consigue una pared abdominal fuerte y resistente y por lo tanto apropiada para la deambulación precoz del paciente, existiendo muy pocas posibilidades de hernia si se reparan de un modo apropiado todas las vainas musculares mediante suturas con algodón o seda fina. Aunque se seccionen transversalmente los rectos abdominales, oblícuo interno y transversos, no

se lesiona la inervación ni la irrigación de dichos musculos Debe practicarse con el mismo cuidado la ligadura y sección de la arteria epigastrica profunda inmediatamente detras o dentro del musculo recto, en todas las incisiones transversales que cortan este musculo

Se recomienda el ensayo de esta incision y que quienes la practiquen comuniquen sus experiencias ya que la opinión del autor sobre *esta incision es altamente satisfactoria*

RIASSUNTO

Descrive la tecnica di un'incisione "fisiologica" della cistifellea I vantaggi di quest' incisione consisterebbero

1 Nel fatto che essa cade immediatamente *sopra la parte che deve essere asportata*

2 Nella circostanza che la ferita tende ad allargarsi spontaneamente in seguito all'incisione del muscolo retto e delle sue fascie non che' all'incisione o la separazione dei muscoli attaccati alle fascie stesse Non si rendono quindi necessarie ne' una profonda anestesia ne' una forte retrazione strumentale

3 Nella formazione di una cicatrice addominale molto resistente, la quale consente una precoce deambulazione La possibilita' di un'ernia laparatomica e' minima qualora la sutura della fascie muscolari venga eseguita *accuratamente con cotone o seta* Per *quanto i* muscoli retti, gli interni obliqui ed i trasversali siano tagliati trasversalmente non si compromette infatti l'innervazione locale mentre viene mantenuta un'adeguata circolazione del sangue (grande cura deve essere naturalmente esercitata nel tagliare e legare l arteria epigastrica profonda che decorre subito dietro o nei *muscoli retti)*

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Treatment of the Duodenal Stump in Gastric Resection

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HISTORICALLY, gastric surgery is not new. Billroth first described his Type II procedure in 1885 and his Type I procedure four years earlier. According to the literature, however, Kronlein performed the first end-to-side antecolic gastrojejunostomy following subtotal gastric resection in November 1887. This procedure, which was first suggested by von Hacker in 1885 after investigative work by Polya, with whom he was then associated, has met with increasing popularity in the past few years. Various other procedures and modifications by such able pioneer surgeons as Polya, Billroth, Pean, von Hacker, von Eiselberg and W. J. Mayo soon appeared in the literature; in fact, some of these surgeons were performing somewhat similar surgical procedures on their own initiative at the time Kronlein first made his work known. The survival percentage for gastric operations remained low until approximately 1910, at which time improvement in anesthesia, surgical technic and preoperative and postoperative treatment brought about great improvements. During the past twenty years, and especially during the past ten, further great advances have been made in preoperative and postoperative treatment, lowering the mortality rate to such an extent that gastric resection is now a fairly common operative procedure and is done by surgeons throughout the country. Preoperative and postoperative supplemental feedings of Vitamin C, the establishment of electrolytic balance, the free use of whole blood and plasma, the restoration of protein balance—all these, plus continuous gastric suction and the use of penicillin, streptomycin and Sulfa drugs, have played no little part in lowering the mortality rate and are now regarded as essential to good surgical treatment of the stomach. Without such an armamentarium, there would surely be a rapid increase in the present favorable mortality rate

There are many pitfalls awaiting the gastric surgeon. One of the most distressing of these is disruption of the duodenal stump. Probably every surgeon who has done any appreciable number of gastric resections has at some time encountered this complication, than which few acute postoperative complications are more distressing or more serious. The mortality rate, even with adequate drainage, is very high; and, of course, without adequate avenues of escape of the duodenal contents from the peritoneal cavity, the mortality rate is approximately 100 per cent. The development of a duodenal fistula is therefore an extremely serious surgical complication. Such fistulas are most likely to occur after gastric resection of the Billroth II type.

There are several causes of duodenal fistula, but this paper is limited to the discussion of fistulas complicating gastric resection.

The most common cause of duodenal fistula is a technical defect in duodenal closure. This, as a rule, is brought about by one of the four following factors or a combination of one or more:

1. The duodenum proper is treacherous material for suturing, since its posterior wall is void of peritoneal covering.
2. The posterior muscular wall is very thin and easily cut through with suture material. The presence of an ulcer on the posterior wall further increases the friability of the adjacent tissue.
3. Pancreatic and gastric juices and enzymes may have a digestive effect on catgut suture material resulting in rapid absorptive action by hypoproteinized tissue.
4. Increased intraduodenal pressure may result from distention due to postoperative atony or to the forceful injection of gastric contents back into the afferent loop.

Should a disruption of the suture line occur, one of two things may be expected: (a) the patient will die from a generalized peritonitis or (b) a duodenal fistula will develop.

The presence of a fistula is soon recognized by the thin, bile-stained, highly irritating obtained by drainage. There is a marked and rapid loss of strength paralleling the rapid loss of fluid pancreatic juices and body protein If the fistula is small and all back pressure is promptly relieved by gastric suction the lesion may heal spontaneously If the lesion is large death usually ensues in a short time

TREATMENT

Treatment both conservative and surgical is far from satisfactory Conservatively it is necessary to protect the skin area as carefully as possible using such soothing dressings or other medications as are indicated and at the same time restricting fluids and foods given by mouth Intravenous and rectal fluids high in protein and salts, should be adequately administered If this treatment is not adequate and operation is elected—or forced, which is a more apposite term in such cases—it must be thoroughly recognized that any further surgical intervention is usually performed on a poor surgical risk Furthermore the operation must be done in an area in which the tissue is even poorer for surgical repair

Should surgical intervention be decided upon the surgeon may elect one of three procedures

1 If the fistulous tract is sufficiently well formed then entire tract may be shunted into the lumen of the stomach This when possible is the operation of choice

2 One may attempt to restore the stump of the duodenum This as a rule is difficult and frequently unsatisfactory owing to edema irritation of the tissue and secondary infection

3 A Witzel type duodenostomy may be performed a small catheter being inserted into

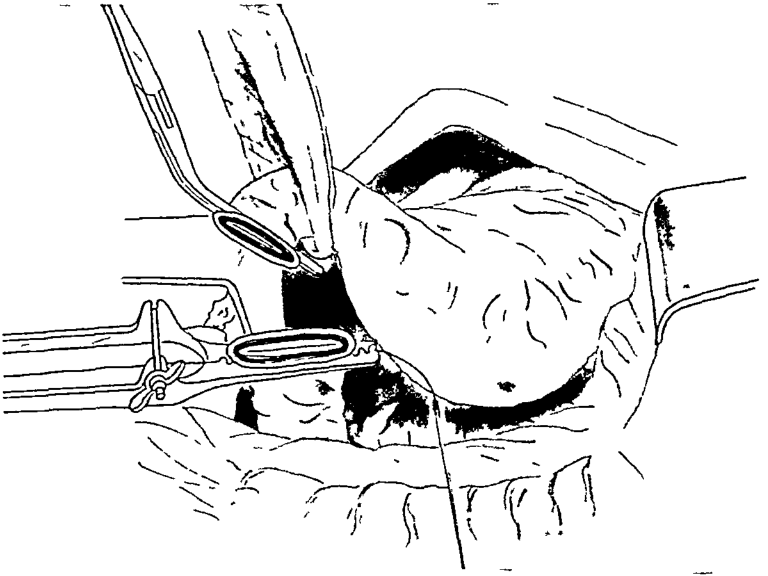

Fig 1—Furniss clamp applied to duodenum perpendicular

the midportion of the second part of the duodenum. A sump pump suction may then be employed. This not only results in controlled drainage with relief of pressure on the duodenal stump but eliminates the irritating effect of the duodenal drainage on the skin. The captured ferment may be restored to the gastrointestinal tract through a nasal tube, thereby assisting in maintaining electrolytic balance and returning the necessary salts, ferments and protein to the body. Should the patient survive, it will become necessary to do a third operative procedure to close the new opening. This should be comparatively simple, since the new opening is easily accessible and is on the portion of the duodenum covered by peritoneum.

The problem, therefore, is to forestall such complications as have been mentioned and to avoid any secondary operative procedure in this area. In order to do this, the surgeon must be entirely familiar with the anatomy of the duodenal area and adjacent structures. He must be able to effect closure in such a manner that even unwarranted back pressure will not be sufficient to cause a disruption or a leak in the suture line. Regardless of what type of repair is effected and regardless of the pathologic condition present, whether it is carcinoma, gastric ulcer, duodenal ulcer, or benign or malignant pyloric obstruction, one thing is essential—that satisfactory closure of the duodenal stump must be attained.

As is well known, the duodenum is not covered by peritoneum on its posterior wall except in the immediate first portion of the first part. The muscular coat and the mucosa of the posterior wall are, therefore, easily torn.

The common duct lies immediately beneath the midportion of the first part, although it enters the second portion of the duodenum along with or adjacent to the pancreatic duct.

The gastroduodenal artery lies immediately behind the proximal part of the first portion of the duodenum. The right gastric artery and vein cross laterally over aforementioned area. The pyloric branches of both right gastric and gastroduodenal arteries freely supply the first portion of the duodenum. Careful hemostasis, therefore, is essential, as bleeding into the tissues of this area definitely precludes satisfactory closure.

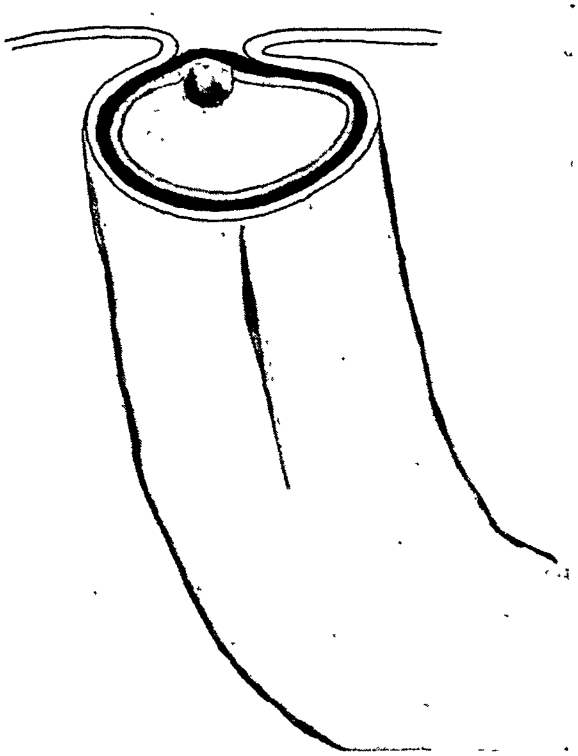

Fig. 2.—Incision made along anterior wall of duodenum to facilitate exposure and closure of duodenal stump with exclusion of ulcer.

The freeing of the duodenum is a matter of the surgeon's personal preference. It may, of course, vary with the pathologic condition. Most surgeons prefer to divide the gastrocolic omentum, first freeing the greater curvature at least in part. A corresponding opening is made into the gastrohepatic omentum, and the stomach is then lifted upward to facilitate further maneuvers. Division of the separate portions of omentum and control of bleeding are then completed in such manner as the surgeon prefers. Once the pyloric end of the stomach is freed and mobilized, the duodenum may be much more satisfactorily approached.

The proper handling of the duodenal stump involves several factors determinable only at the time of operation. Needless to say, the *closure must be surgically competent* regardless of the condition present and the type of operation employed.

For the sake of clarity, cases of disease requiring gastric resection may be classified into two divisions: (1) cases in which the condition of the first portion of the duodenum permits free mobility to be easily attained, and (2) cases in which difficulty is encountered in freeing the posterior wall of the first portion of the duodenum

Cases in the first classification are usually those in which resection is being done for a lesion of the stomach or a lesion on the anterior wall of the duodenum

In such cases I have used most satisfactorily a Furniss clamp type of closure The clamp is placed across the duodenum in such a manner that the instrument is perpendicular to the long axis of the body A long atraumatic needle is placed through the groove in the Furniss clamp, the gastric side is closed with an angle forceps Division is then made with the scalpel to avoid devitalization of tissue, which may occur after use of the actual cautery The gastric segment is then covered with a rubber cuff or with sterile gauze and is reflected from the operative area The stump is treated with a germicidal solution, preferably alcohol, before closing After division of the duodenum the suture is pulled through the Furniss clamp, the clamp is then released, and the suture ends *are snugly and securely tied Two additional* layers of interrupted No 00 chromic catgut sutures are then applied, inverting the stump and, at the same time plicating the posterior wall Care must be exercised in placing the posterior sutures so that the suture is not placed back of that portion of the duodenum which is not covered by peritoneum, if this is done, it may weaken the thin muscular coat and result in a suture perforation due to necrosis An additional and similar layer of interrupted silk sutures is placed as a final safeguard The loose ends are severed, and the stump is allowed to drop back into whatever position of rest it assumes normally No further effort is made to suture omentum or fat over the suture line In my opinion, this repair is adequate and fibrin will coat the suture line over in a few hours Suture of the stump to the head of the pancreas as is done in some cases, is not necessary or wise when good closure can be effected without it

Cases in the second classification those in which difficulty is encountered in mobilizing the first portion of the duodenum, make thorough evaluation necessary. It is well known that long standing and intractable duodenal ulcers sometimes penetrate through the posterior wall into the head of the pancreas and which can be freed only with difficulty or not at all

Some highly competent surgeons, when dealing with such a condition as this, merely divide and close the duodenal stump above the lesion, proceed with resection of the pyloric antrum and leave the ulcer to heal of its own accord once the acid bearing area of the stomach is removed and the gastric contents diverted

Bancroft's modification of the Finsterer resection is one of the most successful as well as one of the most ingenious of the accepted methods of closure in difficult cases Bancroft divides the pyloric end of the stomach ap

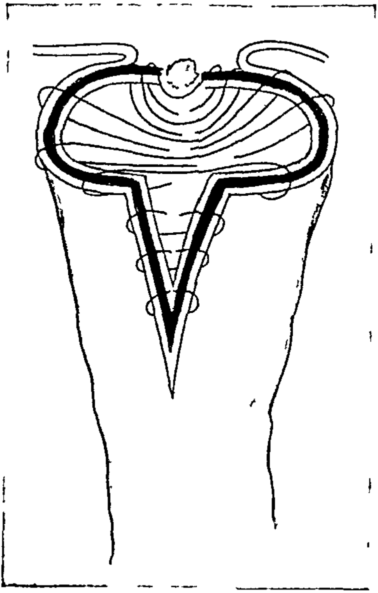

Fig 3—Method of placing interrupted sutures in anteroposterior direction closing stump and excluding ulcer area

proximately 1 inch (2.5 cm.) above the pyloric ring. The mucosa is then carefully reflected away from the muscularis as far down as possible and securely closed with a single encircling ligature. The muscularis and serosa are then closed with interrupted inversion sutures. The ulcer area is below the closure, and the ulcer remains undisturbed.

Another ingenious method of closure in difficult cases, and one to which I have resorted in several instances, is that developed by McNealy of Chicago, who, after closing the stump in certain difficult cases, further protects it against disruption by progressive plication of layers of interrupted sutures along the lateral walls until the divided end of the stump is practically occluded by lateral and anterior pressure layers.

These procedures, while effective and indicated in certain cases, do not altogether meet the requirements of modern surgical standards, especially where previous hemorrhage has been noted and when an operation of the magnitude of gastric resection is being done. Many well-known surgeons have made excellent contributions, and the methods of closure advocated by them have definite advantages in many cases. I have found, however, that in cases like those here mentioned, my most satisfactory results have been obtained by open stump closure. The procedure is as follows:

The pyloric end of the stomach and the immediate first portion of the duodenum are freed in the usual manner; the area is well walled off with moist packs; an angle forceps is placed across the most distal portion of the freed pyloric or duodenal area. The opposing lateral walls of the duodenum are held with Judd-Allis forceps, care being taken not to catch any tissue deeper than the peritoneal covering of the duodenal wall. The stump is then divided with the scalpel distal to the angle forceps, the end of the duodenum being left open. Suction is used to remove all duodenal contents from the open and exposed end of the duodenal stump. The divided section of the stomach is promptly covered and displaced from the immediate operative field. Bleeding vessels, if any, are securely ligated. A second incision perpendicular to the division, approximately 1 to 1½ inches (2.5 to 3.7 cm.) in length, is then made from the divided section of the duodenum, down the midportion of the anterior wall and directly opposite the site of the lesion. This gives an excellent view not only of the ulcer area but of the posterior wall below the ulcer. The ulcer area is then scarified, and a small section is removed for pathologic examination. Should there be evidence of bleeding, this may be controlled by coagulation or by fine atraumatic suture. The mucous membrane immediately distal to the ulcer is then caught in a fine chromic catgut suture, and closure of the mucous membrane and muscularis is effected in a posterior-anterior direction. The sutures are interrupted and are tied snugly but not tight. The second and third layers of interrupted sutures are placed in order immediately above the first row, with meticulous care in closing the posterior portion.

Next, the peritoneum-covered area of the duodenum is inverted by two similar layers of interrupted chromic catgut sutures followed by one layer of interrupted silk. The ulcer area is thus both excluded and firmly closed over. Adjacent fatty tissue is pulled over the stump as an added precaution. The remainder of the resection is carried out as conditions require. If, however, the afferent loop of jejunum is sufficiently long to encourage back pressure on the duodenal stump, it is wise to perform an entero-enterostomy at the most dependent segment of this loop of jejunum. This definitely relieves the duodenal stump of back pressure and allows normal healing during the first forty-eight to seventy-two hours, which is usually the critical period. Space does not permit discussion of the merits of entero-enterostomy in these cases. There are valid arguments both pro and con, and the particular situation may alter the surgical procedure.

SUMMARY

The author points out that technical descriptions of surgical procedures for attacking the duodenal stump are already numerous. They all have one definite purpose in mind, and that is a safe, effective and secure closure—one that will not leak, will not lead to suture necrosis of the duodenal wall, will not blow out under pressure, and offers the greatest margin of safety to the patient. It is best to know them

all, because difficulties are sometimes encountered that tax the ingenuity of the most capable surgeon

Procedures are described with which, although slight variations are necessary in certain instances, the author has had good results in all cases of subtotal gastric resection except those in which a Billroth I Type operation is contemplated This is an entirely different procedure and is not within the scope of this paper

SOMMAIRE

L'auteur donne des descriptions techniques de différents procédés chirurgicaux pour fermer le moignon duodénal Ces procédés sont nombreux Ils ont un but défini une fermeture sûre, efficace, n'offrant aucun danger, qui ne permettra aucune fuite, qui n'entraine pas le danger de la necrose du siège de la suture de la paroi duodénale, qui ne cédera pas à une pression, anormale et qui offre le plus de sécurité aux malades Il est bon de connaitre tous ces procédés car les difficultés qui sont souvent rencontreés moutrent l'ingénuité des chirurgiens les plus capables

Les procédes de résections gastriques sous totales, sont décrits l'opération de Billroth exceptée Cette óperation est un différent procédé et hors des limites de nos rapports

RIASSUNTO

Numerosi sono i procedimenti chirurgici rivolti ad una piu' perfetta chiusura del moncone duodenale Tutti questi metodi hanno uno scopo ben definito quello di assicurare una chiusura perfetta, che eviti il pericolo di spandimenti, di necrosi delle pareti duodenali di diescenza sotto pressione E' bene che il chirurgo sia a conoscenza di questi metodi, in quanto possono presentarsi talvolta delle difficolta' che richiedono una grande abilita' ed intraprendenza de parte dell'operatore

Procedimenti chirurgici ottimi, che assicurano un risultato favorevole, sono stati descritti per ogni forma di resezione gastrica subtotale nell'articolo non vengono pero' compresi quelli per l'operazione di Billroth I, in quanto non rientrano nello scopo del lavoro

SUMARIO

El autor llama la atencion al hecho de que hoy en dia hay numerosos procedimientos para cerrar el tocón del duodeno, Todos tienen por objeto el evitar la necrosis de la pared duodenal y al mismo tiempo asegurar un metodo eficiente de sutura Por esta razón el cirujano debe de familiarizarse con todos estos procedimientos, por cuanto de vez en cuando se presentan condiciones cuya solución requieren toda la ingenuidad del cirujano Se han descrito todos los procedimientos de más valor en la reseccion subtotal del estomago, con excepciòn de los que se emplean en el método operatorio de Billroth No 1 por cuanto este último método está fuera del proposito de este articulo

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Treatment of Diabetes with Bilateral Alcoholization of the Splanchnic Nerves

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CLAUDE BERNARD'S idea of more than half a century ago, according to which the cure for diabetes must be directed toward the nervous system, is being perfected today, with the specification that such treatment must be oriented toward the endocrine-sympathetic system.

After having sought, with negative results, the solution of this problem in the activation of the pancreas with inoculations, experimenters and surgeons have in recent years claimed to find it in the antagonism between pancreatic and adrenal hormones. In fact, it has been observed that an injection of epinephrine (equivalent to an excitation of the sympathetic nerve) causes hyperglycemia; on the contrary, diminution of the secretion of epinephrine always produces a decrease of glycemia.

On the basis of this biologic tie between epinephrine and insulin, and because of the fact that normal glycoregulation depends on the state of equilibrium between the antagonistic vagopancreatic and surrenosplanchnic systems, the cure of diabetes has already been attempted with adrenalectomy (Pieri, Sussi, Oppel, Chiasserini, etc.) and surrenal enervation (Donati, Ciminata, Gorachon, Simarro, Schmidt, Giordano, Crile).

Since the removal of one adrenal gland has proved insufficient because of the compensatory hypertrophy of the other, and the removal of both is not compatible with life, surgeons have tried to concentrate on the portion responsible for secretion of epinephrine, which is the medullary portion of the gland. As removal of this central part only proved technically difficult, if not impossible, the idea was advanced by Pende in 1926 that a physiologic medullectomy might be attained by severing the secretory nerve of the medulla (the splanchnic nerve)

It has actually been verified that in human beings, after such an operation or after simple anesthetic blocking of the splanchnic nerves, there appears a diminution of glycemia, even causing at times hypoglycemic crises (Stelling, Pieri, Lériche). On the contrary, excitation of the splanchnic nerve provokes hyperglycemia, probably through a discharge of epinephrine (Tournade and Chabrol, etc.).

In this respect it had already been observed how the puncturing of the fourth ventricle causes hyperglycemia and glycosuria only with the splanchnic nerves as intermediaries; because, if the splanchnic nerves on both sides are first dissected (Claude Bernard), or only the left side (Pollak), no glycosuria remains. Thus the splanchnico-surrenal system would constitute a complex causing hypoglycemia, antagonistic to the system causing hypoglycemia constituted by the vagus and the islands of Langerhans. Therefore the application of operations on the splanchnic nerve in the treatment of diabetes.

Having executed the splanchicectomy, some authors (Donati, Barronle, Curtis, Haverfield, De Takats, Chabanier, Bréhant and Donoso, etc.) have noted favorable results in cases of serious diabetes (often resistant to insulin), obtaining an improved tolerance of glucides and a greater sensitivity to insulin.

Stelling, Ciceri and Gabrielli were the first to attempt anesthetic blocking of the splanchnic nerves in the treatment of diabetes. They obtained hypoglycemia (though it was often temporary), and this effect was attributed by them to cessation of the action of epinephrine due to blocking of the nervous stimuli of the adrenal glands.

Bréhant (1939) thought of combining anesthesia of the splanchnic nerves with paravertebral anesthesia of the eighth, ninth and tenth dorsal roots of the right side (through which pass the sympathetic nerve threads going to the liver): thus, one would act not only upon

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From the Institute of General Clinical Surgery and Surgical Therapy of the University of Palermo directed by Prof. S. [illegible] the medullary action of the adrenal gland which would be reduced, but upon hepatic glycogenesis, which would be obstructed Hirscheporn and Popper have put into action the procedure suggested by Bréhant and have obtained a diminution of the initial glycemia

Tosatti and Faelli (1939), practicing alcoholization of the left splanchnic nerve have obtained a diminution of glycemia in diabetic patients and have been able to observe that the patients most sensitive to such treatment are those with hypertension and the clinical signs of medullary constitutional adrenalism In fact, it is well known that among the various forms of diabetes there exists one, called diabetes mellitus, rather frequent in whose genesis hyperadrenalinemia seems to be an important factor Tosatti and Faelli maintained that blocking of the splanchnic nerve acts by inhibiting the adrenalino genetic activity of the medullary portion of the adrenal gland diminishing the amount of epinephrine present in the circulating blood

Estella (1943) has also demonstrated that infiltration of the celiac plexus and the splanchnic nerves may be suitable in some cases of diabetes especially when there is resistance to insulin because of its proved restraining action on the sympathetic adrenal *system causing hyperglycemia*

Recently (1947) Bongini and Adreani of the school of Greppi taking up the study of the syndrome of hypertension and diabetes on the basis of new concepts were brought to admit a unitary pathogenesis of neurohormonal order with an adrenal hypophyseal imprint With regard to the surgical treatment these authors maintained that "The various operations on the splanchnic nerves with a suprarenal inhibiting effect (operation of Pende) find in these cases the most rational theoretical prerequisites for their practical realization Already the brilliant results obtained by some Italian authors (Paolucci Valdoni Tosatti and Faelli) demonstrate that surgical therapy in this field should not be limited to some sporadic cases Because from *its application we may have not only beneficial* effects for the patient but there may also derive the possibility to draw sure pathogenetic interpretations from it for such associated syndromes Since it has been found that glycoregulation is undoubtedly influenced by the function of the splanchnic nerves, the question is therefore of immense interest even if research in this regard is scarce and in its first stages The results obtained in diabetes by means of blocking of the splanchnic nerves are still uncertain and at the most temporary because of which it is not possible at the moment to pronounce a definite judgment concerning their efficacy

Considering this I have resolved to make a contribution to the therapeutic efficacy in diabetes of anesthetic and alcoholic blocking of the splanchnic nerves I have executed this procedure bilaterally which so far as I know has not been practiced up to now by other surgeons In fact as has been mentioned alcoholization of the splanchnic nerves in cases of diabetes has been done by very few surgeons thus far and by these has been performed only on one side

Up to now I have pursued my investigations in a group of 12 diabetic patients the majority of whom presented besides more or less conspicuous arterial hypertension Two of them were resistant to insulin

As far as the technic of infiltration is concerned it was practiced by me within the following details as material I have chosen *needles with lumbar punctures of small caliber*, with rounded point 10 to 12 cm long a 10 cc syringe 1 per cent of novocain or a similar drug (recorcain scurocain etc) or 1 per cent percaine, about 10 cc alcohol 95 degrees pure, 1 to 2 cc

The patient is seated on a table at such a height that the surgeon is not obliged to lean down

The injection is made at the pointed apophysis of the first lumbar vertebra which is recognized easily if one remembers that the horizontal tracing from one iliac crest to the other passes between the fourth and the fifth lumbar vertebra Three finger breadths across from the outside of the pointed apophysis of the first lumbar vertebra the needle is driven in horizontally, mounted on a syringe filled *with the anesthetic liquid* The needle is driven in at an angle of about 20 degrees as though it were to reach the median line at a depth of 7 or 8 cm One proceeds slowly, and the tissues are anesthetized along the way before they are traversed. At a depth of 4 to 5 cm. the first bone contact is made, furnished by the transversal apophysis, which represents the location of an important point. Now one tries to bypass the transversal apophysis above or below; after this obstacle has been surmounted, the needle is driven in for about another 3 cm. until a second bone contact is made. With an adept and delicate movement, bending the needle slightly and withdrawing the point from the vertebral contact, one tries to place the needle tangentially against the antero-external face of the vertebral body, thence driving the needle in about 1 cm. It is now located in the premuscular cellular and retrovascular layer where the sympathetic chain passes. Now about 10 cc. of anesthetic liquid is injected, after the surgeon has assured himself, by making the patient cough or by aspirating with the syringe, that no blood or liquid appears.

Proof that anesthetic infiltration has been achieved is given by a pleasant sensation of warmth manifested by the patient after about ten minutes, going progressively from the haunch to the foot. Thence one proceeds with the injection of 1 to 2 cc. of alcohol at 95 degrees.

Among possible accidents one must keep in mind are (1) puncture of a spinal root, which causes pain, and which can happen more easily if the puncture is executed too close to the median line; (2) puncture of the aorta or the vena cava, which happens rarely and is of no importance; it will be enough to withdraw the needle a few mm., and (3) puncture of the dura mater, a serious accident though fortunately rare; the needle must be withdrawn and one must assure oneself, by making the patient cough, that no liquid appears, and it is advisable to warn him that he may subsequently have headache due to the dispersal of liquid from the puncture in the fascular membrane.

In the patients treated by me, the infiltration was not executed ambulantly but after the patient had been admitted to the clinic. In one stage I have proceeded with the splanchnic blocking on one side, the next day, on the other.

While the procedure and the movements described above were being executed, the punctures were always well tolerated and I observed no accidents or complications. Only in a few cases was there a slight temporary indisposition with a tendency to lipothymia, which manifested itself immediately after the puncture and was due to the sudden drop in arterial pressure.

In the attached synoptic table I present the principal data resulting from my case histories.

The results I obtained can be summed up thus: in the 12 diabetic patients treated with anesthetic and alcoholic blocking of the splanchnic nerves favorable results were obtained (diminution of glycemia and of arterial pressure) in 9, while in the other 3 (cases 8, 11 and 12) the result was unsatisfactory in regard to glycemia as well as to blood pressure.

After the treatment I have also noticed, in cases in which the outcome was favorable, a diminution of glycosuria and an increase in the sensitivity to insulin, always a consequence of functional modifications of the adrenal glands. Furthermore, an improvement was noticed in subjective disturbances caused by hyperglycemia and hypertension.

The decrease of glycemia varied in the different cases, the values ranging from a maximum of 1.5 to a minimum of 0.3 Gm. per cent. The decrease of arterial pressure in some cases was notable, ranging from a minimum of 20 to a maximum of 40 milligrams of mercury.

Worthy of note is the fact that the variations of glycemia had a course parallel to that of the arterial pressure; patients whose condition was unchanged in regard to glycemia were unchanged also in regard to arterial tension.

The changes in glycemia as well as in arterial pressure were observed, in almost all cases, a few hours after infiltration of the splanchnic nerves. They became more evident after twenty-four to forty-eight hours, stabilizing themselves to almost constant values after about a week.

The improvement obtained in the diabetic patients treated by me has always been temporary; it has persisted in different cases for a variable period, from a minimum of three to a maximum of ten months. In some of the aforementioned cases I have repeated the anesthetic and alcoholic blocking of the splanchnic nerves—always bilaterally—ob-

Effect on Glycemia and Hypertension of Alcoholization of Splanchnic Nerves

Patient	Age	Diagnosis	Treatment	Sugar Gm %		Arterial pressure		Outcome
				Before	After	Before	After	
1 (M C)	46	Diabetes (5 yr), moderate hypertension	Bilateral splanchnic alcoholization	1 59	0 99	170/90	140/75	Temporary improvement
2 (C A)	51	Serious diabetes (6 yr), light hypertension	Bilateral splanchnic alcoholization	2 13	1 55	160/80	120/70	Improvement
3 (L G)	56	Diabetes (3 yr), hypertension	Bilateral splanchnic alcoholization	2 10	1 80	190/90	150/75	Improvement
4 (M M)	60	Diabetes (8 yr), hypertension	Bilateral splanchnic alcoholization	1 40	1 10	160/75	140/70	Slight improvement
5 (S A)	50	Diabetes (2 yr), hypertension	Bilateral splanchnic alcoholization	2 70	1 65	190/90	170/80	Improvement
6 (R V)	63	Diabetes (6 yr), hypertension	Bilateral splanchnic alcoholization	1 90	0 95	185/100	160/80	Slight improvement
7 (F F)	65	Serious diabetes (6 yr), insulin resistant	Bilateral splanchnic alcoholization	2 10	1 35	180/100	160/90	Improvement
8 (R G)	49	Diabetes (5 yr), moderate hypertension	Bilateral splanchnic alcoholization	1 90	1 85	180/90	180/90	Unchanged
9 (C M)	52	Diabetes (12 yr), hypertension	Alcoholization left splanchnic	2 10	1 30	170/80	150/70	Improvement
10 (N A)	58	Diabetes (2 yr), hypertension	Bilateral splanchnic alcoholization	1 90	1 20	210/130	190/100	Improvement
11 (C C)	65	Serious diabetes (4 yr), hypertension	Bilateral splanchnic alcoholization	2 40	2 45	170/80	160/70	Unchanged
12 (L A)	56	Diabetes (1 yr), light hypertension	Left splanchnic alcoholization	1 45	1 50	160/90	165/90	Unchanged

serving in the majority a new decrease in glycemia and arterial tension Treatment is in progress at this moment, and I hope to record the results in a subsequent note, from the ultimate results observed I shall perhaps be able to state positively whether repeating the infiltrations will bring about a permanent or only a temporary curative effect

In conclusion, I can affirm that my preliminary investigations show that in diabetic persons with associated [illegible] or resistance to insulin, [illegible] ic and alcoholic blocking of the splanchnic nerves induces lowering of the blood pressure and a decrease of glycemia in the majority of cases (9 out of 12). The decrease occurs with varying intensity and lasts several months; in some cases up to ten. It remains to be verified whether successive infiltrations will change this result from temporary to permanent.

The results obtained by me up to now, confirming the experience of other authors, encourage practice of blocking the splanchnic nerves in cases of advanced diabetes, especially if it is associated with hypertension or the patient is resistant to insulin.

SUMMARY

The author reports the results of his preliminary investigations with bilateral anesthetic and alcoholic blocking of the splanchnic nerves in the treatment of diabetic patients with associated hypertension. This technic resulted in a decrease in glycemia and a lowering of the blood pressure in the majority of cases (9 out of 12). Further investigation will determine whether repeated blockings will prove to be a means of permanent control. Thus far the results, though excellent, are temporary.

RÉSUMÉ

L'auteur nous fait part de son expérience du traitement des malades diabétiques par l'alcoolisation bilatérale des nerfs splanchniques. Il conclut en disant que cette thérapeutique encourage cette façon de procéder, bien qu'il reste à s'assurer si les infiltrations répétées sont capables de procurer une guérison permanente. Ainsi, en ce qui concerne les résultats, bien qu'ils soient excellents, ils sont temporaires.

RESUMEN

El autor comunica los resultados de sus investigaciones preliminares con el bloqueo alcohólico anestésico bilateral de los nervios espláenicos en el tratamiento de los pacientes diabéticos con hipertensión asociada. Esta técnica determina un descenso en la glicemia. y también una baja en la presión sanguínea en la mayoría de los casos (9 de cada 12). Las investigaciones ulteriores determinaran si los bloqueos repetidos son un medio de dominar permanentemente estos síntomas. Los resultados obtenidos hasta la fecha aunque excelentes, han sido temporales.

RIASSUNTO

Ricerche preliminari condotte dall'A. dimostrano che il blocco bilaterale con anestetici e con alcool dei nervi splancnici conduce nella maggioranza (in 9 casi sopra 12) dei soggetti diabetici ed ipertesi ad una contemporanea diminuzione della glicemia e della pressione del sangue.

Indagini ulteriori potranno stabilire se il blocco ripetuto degli splancnici e' capace di condurre ad un controllo permanente delle due affezioni. Per quanto buoni, i risultati sono rimasti finora temporanei.

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Gastroesophageal Vagal and Sympathetic Innervation

In Relation to an Anatomic Approach to Cŏmbined Gastric Vagosympathectomy

ALFRED L. SHAPIRO, M.D., AND GREGORY L. ROBILLARD, M.D.
BROOKLYN

A REVIEW of the literature and a schematic outline of anatomic observations based on a series of 32 regional dissections will be presented.

Vagotomy, since its revival by Dragstedt in 1943, has been widely used in the treatment of peptic ulcer. The modern procedure, unlike the operation described two decades ago or earlier, is more comprehensive and is performed near the level of the diaphragm, either above or below it. Concurrent with the renewed appreciation of vagotomy has been a revival of investigative interest in the anatomic distribution of the nerves concerned.

Among recent papers on the morphologic character of the vagus nerves in relation to surgery are those of Chamberlin and Winship, Dragstedt, Doubilet and his co-workers, Weinberg and his associates, Bradley, Walters and Jackson. Some of these investigators (Bradley, Walters and Jackson), although conceding that the large nerve trunks alongside the esophagus under study were not entirely vagal but contained sympathetic components, stated that it was beyond the scope of their researches to delineate the associated nonparasympathetic fibers. Most authors, however, have ignored completely any constituent fibers that were not vagal.

In reference to the sympathetic components of the plexus gulae and the sympathetic distribution to the esophagus and the stomach proper, relatively few data are available, and those available are largely controversial. Opinion is divergent, ranging from an almost complete negation of the existence of a sympathetic distribution to the esophagus proper (Morris) to complete identification of the vagal trunks entering into the esophageal plexus as sympathetic branches from the cardiac nerve and other mediastinal structures (Kiss). Such workers as McSweney, Kiss, Duncan and others, writing some twenty to thirty years ago, reflected the prevailing disagreement on this score. For fairly detailed prevalent versions of the sympathetic nervous anatomy of the esophagus and stomach the reader is referred to the monographs of White, Potts, Kuntz, Knight and Mitchell. There is considerable diversity of opinion, however, among these authors as well.

Since an anatomically selective and complete gastroesophageal vagectomy or vagotomy leaves an unaltered and physiologically unopposed sympathetic innervation, a functional imbalance supervenes. A number of authors (Dragstedt; Kolk; Sweet) have attributed the unfavorable end results of vagotomy to this effect, a premise now under study by the writers of this article.

GASTRIC "NEURECTOMY" VERSUS VAGOTOMY

It becomes obvious that if the operative procedure called vagotomy actually accomplishes a sectioning not only of the vagus but of a large number of sympathetic nerve fibers, the term is a misnomer. Deferring to this possibility, some surgeons refer to the procedure as gastric neurectomy. However, in evaluating the clinical effects of the operation almost all authors restrict their description of effects to those that would be expected should only the parasympathetic fibers be interrupted.

We undertook this survey in order to determine the degree to which sympathetic fibers are severed by the usual surgical procedures collectively referred to as vagotomy. As the investigation proceeded, however, the concept developed that a combined vagosympathectomy might be a desideratum rather than an outcome to be avoided. The rationale of transabdominal combined gastroesophageal vago-

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From the Surgical Services of the Brooklyn Cancer Institute, the Norwegian Hospital and the Beth-El Hospital.

Presented in part as a scientific exhibit at the annual meeting of the New York State Medical Society, May 1948.

sympathectomy lies in the fact that there is a variable sympathetic component of the right and left gastric nerves as they descend from the plexus gulae (Braeuker Bradley, Cannon, Hovelacque Knight, Mitchell, McRea, Potts, Teitelbaum) Just below the gastroesophageal junction the vagi may communicate further with gastric sympathetic nerves as well as with recurrent vagal filaments from the celiac plexus Incomplete vagotomy has been attributed, in some instances to these interconnecting fibers In general the sympathetic and parasympathetic systems are physiologic antagonists and selectively eliminating the effect of one system will only intensify the action of the other When sectioning of the gastric nerves in those instances in which the descending periesophageal trunks have a significant sympathetic component ablates the vagal effect completely and the sympathetic effect also to a large degree the resultant motor secretory activities of the upper part of the alimentary tract become more truly automatic or self-regulating

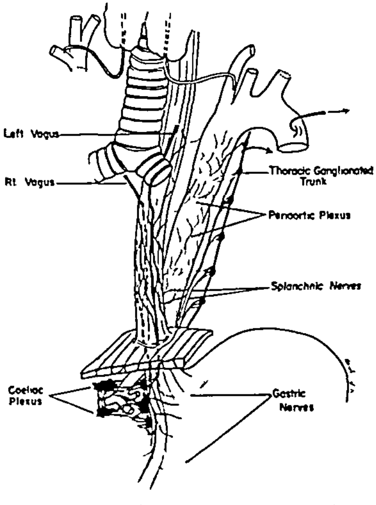

Fig 1—Anatomic diagram showing nerve distribution to middle and lower portions of esophagus

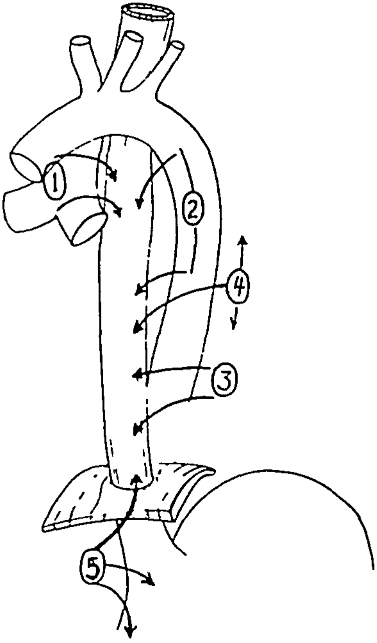

Fig 2—Major sources of *sympathetic nerve fibers* to middle and lower portions of esophagus *1*, cardiac and bronchial plexi, *2*, periesophageal plexus (almost always present), few to many fibers, *3*, Splanchnic nerves usually several fair sized fibers, *4*, thoracic ganglionated chain, inconstant, variable, usually a few small fibers, *5*, cardiac plexus—along left inferior phrenic and upper branches of left gastric arteries Sympathetic fibers from these sources always constitute a component, variable in extent of the gastric nerves resected in so called vagotomy

Numerous reports apparently substantiate the fact that in selected cases of peptic and marginal ulcer vagotomy is a well established *procedure of therapeutic value* (Alvarez, Collins and Stevenson, Crile, Dragstedt, Weinberg, Harkins, Johnson and Machella, Meyer and Habnel, Miller and Olwin, Ruffin and

White; Walters). Disturbing major postoperative complications, however, reported by some authors to occur in more than one third of all cases, are severe postoperative distention, atony, diarrhea, fetid eructation, and dysphagia due to esophageal spasm. In a number of instances the distressing distention and atony, as well as other unfavorable side effects, may be due to the largely upopposed action of the sympathetics. This would apply particularly to cases in which a minimal number of sympathetic fibers descend with the nerves sectioned in the usual gastric neurectomy. Detailed tabular consideration of the incidence and degree of postoperative atony following vagotomy has been presented by Johnson, Moore, Warren, Ruffin, Dragstedt, Weinberg, Stein, Postlethwait, Collins, Miller, and their associates.

FUNCTIONAL GASTROENTERIC ANTAGONISM OF THE VAGI AND THE SYMPATHETIC NERVES IN RELATION TO SURGERY

When one considers the known antagonistic actions on the stomach and esophagus of the vagus and the sympathetic nerves, it becomes at least theoretically predictable that interruptions of the vagus neuromotor-secretory mechanism, if a largely intact sympathetic stem is left, would in such cases lead to seri- motor and secretory disturbances of the trointestinal tract. Alvarez expressed the opinion that the vagus and the sympathetic nerves act, in a sense, as counterbalancing brakes.

A tabular listing of the more generally reported and accepted actions on the stomach and esophagus of the vagus and the sympathetic nerves respectively would run as follows:

Vagus	*Sympathetic*
Increases tone	Decreases tone
Increases peristalsis	Decreases peristalsis
Accelerates gastric emptying	Delays gastric emptying
Relaxes sphincters	Contracts sphincters (car] and pylorus)
Increases acid secretion	Dec acid secretion
Is primarily motor-secretory	Inc cus secretion
Is a vasodilator (?)	Sen nt (pain p
	Is a tor

hagus and the sto a con- e of intrinsic ity in activity. me ough

Auerbach's and Meissner's plexuses. In sympathectomized human beings and in experimental animals subjected to vagotomy and thoracolumbar sympathectomy, little lasting disturbance in motility appears to have been noted, according to the reports of most workers (Alvarez; Cannon; Dragstedt; Grimson; Ivy; Postlethwait; Ray; Stein; White and Smithwick). Achalasia, or cardiospasm, as experimentally induced in animals by vagotomy, has been reported by Knight and Mitchell as preventable or curable by coupling with a sympathectomy performed by stripping the fibers along the celiac and left gastric arteries.

To combat the relatively great likelihood of *postoperative abdominal distention and impaired gastrointestinal motility*, a number of surgeons (Dragstedt; Moore; Priestley and Hallenbeck; Small; Womack and Crider) have combined vagotomy with gastroenterostomy as a so-called drainage procedure. Others, e.g., Jackson, have resorted to modified or "selective" vagotomy in an attempt to preserve the vagal innervation of the liver, pancreas and intestine. Still others have come to advocate coincident vagotomy and subtotal gastrectomy (Colp; Kolk).

In substantiation of the theory that coincident sympathectomy may forestall possible postvagotomy gastroesophagel sympathetic dominance and its resultant atony, the opinions of Sweet and Dragstedt are of interest. The former author has pointed out that pronounced gastric atony after esophagectomy and partial gastrectomy is relatively infrequent and moreover is observed least often after high esophagectomy. His explanation is that division of the gastrocolic and gastrohepatic omentum, caried to the pylorus, probably interrupts the main sympathetic nervous fibers which would otherwise become overactive because of the absence of the inhibiting action of the vagal fibers sacrificed in the course of the operation. Dragstedt stated that the local automatism of the stomach makes it possible for that organ to display its normal motility after all extrinsic nerves have been severed. Under normal conditions, however, its activities are under the influence of the vagus nerve and the sympathetic system, and in general the effect of the latter is antagonistic to that of the vagus. Sudden removal of the tonic

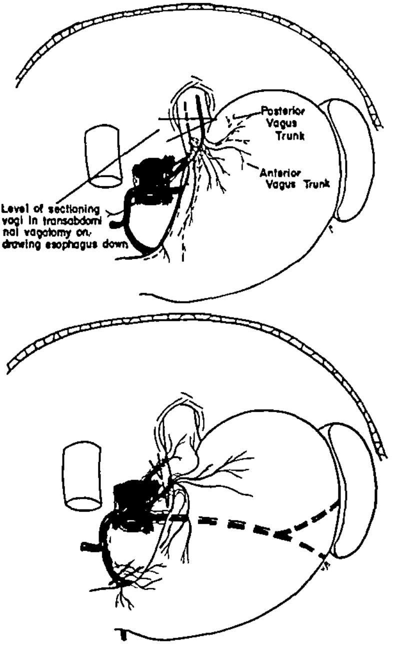
Posterior Vagus Trunk
Anterior Vagus Trunk
Level of sectioning vagi in transabdominal vagotomy on drawing esophagus down

Fig 3—Two diagrams illustrating the perivascular and hepatogastric distribution of the major gastroesophageal branches of the celiac plexus The V's indicate points at which ligation of left gastric and inferior phrenic arteries transection of hepatoduodenal ligaments and stripping of the gastroduodenal and right hepatic arteries would generally sever over 90 per cent of the celiac branches, thus largely sympathectomizing the stomach

effects of the vagus nerve leads leaves the inhibitory influence of the sympathetic system unopposed, and the end result is of course, a marked inhibition of the tonus and motility of the stomach After a period of time, varying with different patients readjustment of the peripheral motor mechanism occurs and the stomach's motility returns to its normal level It is likely that it never regains the hypertonus and hypermotility so commonly observed in patients with ulcer Both Kolk and Colp have demonstrated that residual gastrointestinal atony is minimal when vagotomy has been coupled with subtotal gastrectomy Since the latter procedure involves ligation of the left gastric artery and incision of the lesser omentum, a concurrent sympathectomy, as will be noted later, has actually been carried out in such cases

We advocate ligation of the left gastric artery and the left inferior phrenic arteries as an important maneuver in the technic of gastric vagosympathectomy Both of these structures are in the immediate operative field of transabdominal supradiaphragmatic vagotomy and are readily accessible with the usual mobilization and exposure once the hiatus has been opened and the lower portion of the esophagus brought down The left gastric artery is of course frequently and quite safely ligated in the majority of standard partial gastric resections, and the lesser omentum is routinely severed in operations on the stomach, with little ill effect Sommervell, moreover, has recently advocated ligation of the arteries of the lesser gastric curvature *in toto*, and about five out of every six of the small branches running from the gastroepiploic vessels to the stomach walls, as a curative "physiologic gastrectomy" for the treatment of peptic ulcer It should be noted to the contrary, however, that Baronofsky, studying the affects of multiple ligation of gastric vessels for peptic ulcer in dogs, found that no significant alteration of acid gastric secretion was produced, nor was the appearance of the gastric mucosa changed However, the observations of Baronofsky confirmed those of Sommervell, Layne and Bergh, and Babkin and his associates in that the blood supply of the stomach can be adequately maintained if only one of the main arteries is left intact, despite the failure of such ligations to produce a uniform reduction in acidity A puzzling note here is that ligations of the gastric artery and gastric neurectomies have both been employed to induce ulcers experimentally and have been advocated, on the other hand, as effective ulcer therapy

White and Dragstedt expressed the opinion that the gastric sympathetic fibers are important chiefly as vasoconstrictors and visceral sensory nerves, being visceromotor to a lesser extent One might conclude from the wor f

Wolf and Wolff that increased vascularity and turgor, as demonstrated in cases of hyperemotionalism and possibly mediated through the vagi, renders the surface of the gastric mucosa more friable and susceptible to injury. On the other hand (Dragstedt, 1948), excessive vasoconstriction and local anemia, such as occur after sympathectomy, have also been postulated as factors in the causation of ulcer.

ANATOMIC CONSIDERATIONS

Dissections were made of 32 cadavers, all refrigerated, in whom death had occurred less than two days before. The anatomic studies were made in the course of complete necropsy, and no subjects were included in whom there existed disease or obesity of such a nature as to obscure the structures of the mediastinum or the upper part of the abdomen. Unless otherwise specified, the figures given are derived from this series of dissections. Corroborative or explanatory citations are often indicated by number. In studies of this kind, obviously no claims to originality can be made. Our intent is rather to ''ᵒte and amplify the
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ON ANATOMIC

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Vagal L.
tion extends
trunks:

Number of trunk	
Right	Left
2	2
1	1
2	1
1	2

The trunks generall
periesophageal plexus
30 cases and absent in 2)
5 cm. above the hiatus, re-
and posterior right cords
esophageal junction. (Occasi
bedded in the musculature.)

Number of cords		*Number of cases*
Right	Left	
1	1	22
1	2	6
2	1	2
2	2	2

Vagal Distribution, Gastric.—The left (posterior) vagus divides in the main into four groups of branches, radiating from the lesser curvature:

(a) Gastric—about half of bulk distributed as 3 to 8 or more branches to gastric wall
(b) Pyloric—to pylorus, along lesser curvature
(c) Hepatic—to porta hepatis along hepatic artery
(d) Celiac—along left gastric artery to celiac ganglion

The right (anterior) vagus divides into two main groups of branches:

(a) Gastric (lesser number) to stomach
(b) Celiac (greater number) about two thirds of total bulk, to celiac ganglion

Sympathetic Distribution, Esophageal.—A variable number of filaments pass to the esophagus, usually entering the plexus gulae from the following sources:

Source	Many filaments	Few filaments	None
Periaortic plexus	21 cases	8 cases	3 cases
·chnic	4 cases	11 cases	21 cases
	2 cases	18	12 cases

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Comment on Foregoing Data: In 18 dissections an estimated 85 per cent or more (in bulk) of the ascending sympathetic fibers from the celiac plexus and associated descending vagal branches of gastric nerves were observed within a 3 cm. radius of the left gastric, left inferior phrenic and gastroduodenal arteries. In only 2 cases were nerves of appreciable size observed to enter the stomach after traversing the avascular central area of the hepatogastric ligament. This is in keeping with the illustrated observations of McRea, Potts and Knight and with the brief descriptions in standard texts on anatomy (Cunningham; Gray; Morris).

To forestall possible postvagotomy gastroesophageal sympathetic dominance, simultaneous major "gastrosympathectomy" is suggested and in most instances, in view of the configuration of the gastric autonomic nerve fibers as herein described, is readily and effectively performed coincidentally with (1) ligation and partial excision of the left gastric and the left inferior phrenic arteries; (2) section and excision of nerves along the lesser curvature and transection of the gastrohepatic ligament, and (3) stripping and excision of nerves along the gastroduodenal and right gastric arteries.

In accordance with these anatomic observations, about 90 per cent of the gastric celiac plexus branches and consequently almost all of the sympathetic distribution to the stomach, the esophagus and possibly the uppermost portion of the intestine may be extirpated by these additional steps in a transabdominal approach to vagotomy. Moreover, the postulated recurrent vagal fibers to the stomach coming from the celiac plexus would be resected in this procedure. Since the probability of regeneration of autonomic nerve fibers exists, whether after vagotomy or after sympathectomy, we do not contend that permanent extirpation is hereby accomplished. All that is sought is a means of obviating immediate uncontrolled sympathetic overaction and dominance of gastrointestinal function until the adjustive automatic activities of the alimentary tract can come into play. It must be kept in mind, however, as demonstrated by the studies of Grimson, Ray, Womack and others, that pain perception from the gastrointestinal and biliary tract is diminished or abolished after ablation of the sympathetic afferent or viscerosensory fibers, and that patients must, accordingly, be kept under close clinical observation, since relief of ulcer pain under these conditions does not necessarily indicate healing.

GENERAL DISCUSSION

Section of the vagus nerves was first attempted a number of decades ago and was abandoned because of conflicting and unsatisfactory results. Similarly, gastric and esophageal sympathetic ablation of varying degrees, occasionally performed in combination with vagal section, have been reported by various authors in the past, with uncertain and disputed end results. However, review of the procedures previously recommended reveals that in the main they were partial and ineffective, just as the early vagotomies were largely incomplete. Thus, Schiassi incised the gastrohepatic omentum along the lesser curvature and circumferentially incised the gastric cardia in an attempt to denervate the autonomic supply of the stomach. His report indicated favorable results in the treatment of peptic ulcer in a small number of cases. Bircher did a somewhat similar surgical procedure, with equivocal results. Stierlin was another early user of an analagous method. Latarjet also attempted combined gastric neurectomy along similar lines. Ivy carried out a procedure of this nature on experimental animals Pearl, in the treatment of tabetic gastric crises, advocated sectioning of the sympathetic nerves and, one would judge from the operation as described by him, cut the vagal nerve supply as well. Watanabe concluded that the results of splanchnicectomy in combination with vagotomy were at best equivocal. Moreover, it should be noted that Froelich reported favorable results in the treatment of peptic ulcer by sympathectomizing the stomach through splanchnicectomy and partial celiac ganglionectomy, resorting to the direct converse of the so-called vagotomy. It might be noted in passing that, along the lines suggested by Womack, the combined vagosympathectomy as defined by us might be adapted for the treatment of biliary dyskinesia by extirpating the pericholedochal, the hepatic periarterial and the gastrohepatic interligamentous vagal and sympathetic nerve branches without resorting to resection of the celiac ganglion in its entirety.

With the present vogue of thoracolumbar sympathectomy as a surgical amelioration of hypertension and the recrudescence of vagotomy in the therapy of peptic ulcer (since the two diseases are common and not infrequently coexist), a few patients have been subjected to both splanchnicectomy and vagotomy. In some instances, which at present are enjoying the status of interesting surgical rarities, it appears that both clinical conditions have in some measure improved, although accurate evaluation of the end results in a significant number of such cases will not be available for a number of years. Harkins, moreover, has reported recurrent ulceration after vagotomy coupled with sympathectomy for hypertension.

A possible tendency toward aggravation of preexisting ulcers in hypertensive persons undergoing sympathectomy has been discussed by a number of surgeons in the recent literature. Dragstedt and Wangensteen have both stated that in such instances of unopposed vagal dominance peptic ulcers may undergo exacerbation. The danger of painless perforation in ulcers in which the visceral afferent pathways have been interrupted by sympathectomy is stressed by Dragstedt, Small, and Mandl, among others. Blegen, Weeks, and Priestley have reported untoward complications of this nature. However, since the somatic as well as the visceral sensory pathways of the parietal peritoneum and the anterior abdominal wall are irritatively stimulated in most gastrointestinal perforations, when a limited gastric sympathovagotomy is performed this consideration should not apply equally; for any disruption of viscerosensory mechanisms has been localized as compared to that following thoracolumbar sympathectomy.

The precise value of gastric neurectomy or vagotomy as yet remains to be established. Certainly, just as it proved too early to condemn and abandon vagotomy as a therapeutic procedure for ulcers because of its limited and incomplete application of yesteryear, so clinical reasoning would seem to justify further trials of thoroughgoing gastric vagosympathectomy. For several years at least it will probably be best to consider it a presumptively useful surgical treatment in selected cases, though still in the investigative phase. This study has been presented for comparison of the procedure with vagotomy alone and vagotomy performed in conjunction with gastroenterostomy when indicated. This excludes from evaluation subtotal gastrectomy and vagotomy, which, when performed together by the standard technics, produce in effect the equivalent of a true total gastric neurectomy by virtue of the sacrifice of the right and left gastric arteries and section of a great part of the gastrohepatic ligament.

The authors have to date, over an eighteen month period, performed gastric vagosympathectomy with gastroenterostomy as outlined above in 6 cases of medically intractable duodenal peptic ulcer associated with markedly hyperacid hypersecretion. Although this series is too small to be conclusive, relief of symptoms with relatively little postoperative gaseous distention or abdominal fulness and discomfort ensued. All patients left the hospital within two weeks after the operation, without significant complications. On this admittedly limited basis it is felt that further trial of the procedure is warranted. In accordance with the recent work of Meyer, (1948) who demonstrated a postvagectomy decrease in lysozome titers in cases of peptic ulcer, postoperative lysozome studies were made by a viscosimetric method of assay, in 4 of our cases. The preliminary indications are that lysozome concentrations are relatively low for at least three months after operation. We hope to amplify these studies in a subsequent paper.

SUMMARY

The gastroesophageal vagal and sympathetic innervation is described as observed in a series of 32 regional dissections. The literature is reviewed with reference to the incidence of postoperative distention and atony following vagectomy as usually performed. A correlation of such complications with the resultant unopposed sympathetic dominance of gastrointestinal function is presented. A rationale and technic of transabdominal gastric vagosympathectomy to forestall postvagotomy sympathetic overaction are given, based on the generally prevalent periarterial configuration of the gastric sympathetic nerves branching from

the celiac plexus and coursing in the gastrohepatic omentum

RÉSUMÉ

L'innervation du vague gastro œsophagien et l innervation sympathique sont décrits tels qu'ils se présentent dans une série de 33 dissections regionales Les articles traitant cette question sont considérés en tenant compte de la possibilité d une distension post-opératoire et de l'atonie qui suit la vagotomie lorsqu'elle est réalisée comme on a l'habitude de le faire On presente la correlation qui existe entre de telles complications et la dominance fonctionnelle non opposée au sympathique gastro-intestinal On donne une analyse et la technique de la vagosympathectomie gastrique trans-abdominale pour éviter un hyperfonctionnement du sympathique apres la vagotomie basee sur la configuration périartérielle habituellement rencontrée des nerfs sympathiques gastriques issus du plexus cœliaque et se répandant dans l'épiploon gastro hépatique

RESUMEN

Se presenta una serie de 33 disecciones regionales con motivo de las cuales se estudia la inervación vagal y simpática gastroesofágica pasándose revista a la literatura medica en relación a la frecuencia a la distensión postoperatoria y atonia a continuación de la vagectomia analizandose la correlacion de dichas complicaciones que son resultantes del dominio simpatico en la funcion gastrointestinal Se expone los fundamentos y tecnicas de la vago simpatectomia gástrica transabdominal para contrarrestar la hiperaccion simpatica postvagotónica basada en la configuración periarterial prevalente por lo general de los nervios simpaticos gástricos que nacen del plexo celiaco y se ramifican en el epiplon gastrohepático

RIASSUNTO

Descrive l'innervazione vagale e simpatica dello stomaco e dell'esofago in base ad una serie di 33 dissezioni anatomiche Passa in rassegna la letteratura in riguardo alla frequensa della distensione e dell'atonia che conseguono alla solita vagotomia Riferisce queste complicazioni postoperatorie alla perdita di ogni inibizione al simpatico gastro intestinale Propone una nuova tecnica di vago simpatectomia gastrica transaddominale che si basa sopra la prevalenza delle fibre simpatiche periarteriose che si irradiano dal plesso celiaco e che si dirigono nell omento gastro-epatico

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The International College of Surgeons

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In appreciation of the fine response to date, the Contest Committee has voted to prolong the period during which submissions will be received The title of the essay is "The Meaning of Hippocrates in the Medical World of Today", the award, a $100 Government bond There is no restriction as to eligibility or as to the length of the essay Dr Skevos Zervos, noted Greek physician and authority on the life of Hippocrates heads the judges' committee All manuscripts should be addressed to

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The winning essay will be published in the *Journal*

Gastroscopy in Surgery

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MILAN, ITALY

IN THE last three years, 410 gastroscopic studies have been done on patients in whom various disturbances of the gastroduodenal tract seemed to indicate surgical intervention. Since in the majority of cases endoscopic examination was done shortly before operation, it was possible to gather a few observations worthy of recording.

The usual technic was employed in every case. The patient was placed on his left side after administration of a local anesthetic. (Ten per cent cocaine hydrochloride was used at first, but in the last 100 cases we used 1 per cent pharmocaine, which produced better results. In only 10 cases was an injection of morphine given to diminish general sensibility. As the inconveniences produced by this substance are far greater than its advantages, its use was abandoned.) Our former conviction remained that in certain cases this gastroscopic method can be used to great advantage in diagnosis; it agrees perfectly with the results of roentgen examination. The indications for gastroscopic examination vary naturally, according to the lesion in the particular case.

GASTRODUODENAL ULCER

To be able to confirm, more or less decidedly, the result of roentgen examination for gastric ulcer, one must determine the site of the lesion, its width, its depth, the state of its margins and the condition of the surrounding mucosa. Gastroscopic examination will also reveal the condition of the membrane around the lesion, and above all the kind and extent of any gastritis that may accompany the ulcerative process. This last is the basic point, because in most cases it is roentgen examination that must determine whether the ulcer exists and, if so, where. Gastroscopic examination should define, with the greatest possible detail, the condition of the mucosa.

In the presence of duodenal ulcer duly recognized by roentgen examination one must search with the endoscope for the possible coexistence of gastric ulcer. The hyperkinesis caused by the duodenal ulcer can, in certain cases, cause the gastric recess to be hidden from the roentgen rays, the passage of barium being obstructed by disordered movements of the muscles. Besides, when gastric ulcer is present, endoscopic examination will define exactly the state of the mucosa. Whether resection or gastroenteroanastomosis is performed depends on whether the gastritis is hypertrophic, erosive or atrophic.

If it is true that in the last few years the majority of surgeons all over the world choose to perform an ample resection as for duodenal ulcer, restricing gastroenteroanastomosis to special well defined cases or cases in which resection is technically difficult, it is also true that the surgeon who is mindful of his patient's future will be more sure of himself if he makes the resection as ample as possible. This is true if the gastroscope indicates a stomach affected by serious hypertrophic or erosive gastritis; it is still more apposite if the test meal leads to the same conclusion as does the endoscope (hypertrophic gastritis can, in special cases, be a cause of gastric hyposecretion). Resection will doubtless cause postoperative inconvenience in cases of atrophic gastritis, a rare condition indeed and difficult to demonstrate by the usual means of research.

If the surgeon finds the operation technically difficult, he will undertake it more confidently if the two examinations aforementioned have given him assurance that the patient has, coexistent with the ulcer, serious hypertrophic, hypersecretive or erosive gastritis. Otherwise, if the diagnosis has been made of atrophic gastritis or if the mucosa in appearance and function is almost normal, the surgeon will do, in the first case, a gastroenteroanastomosis according to his choice; in the second case it will be a necessity.

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Conclusion. When gastroduodenal ulcer is present, roentgen examination in most cases will establish the diagnosis. Endoscopic examination after a test meal will indicate which is the best surgical technic to adopt.

GASTRIC NEOPLASMS

Several problems must be taken into consideration. Roentgen examination reveals the neoplasm, the endoscope confirms it, it remains for the surgeon to specify the type. One may assume that about one half of all gastric neoplasms will reveal gastroscopically a stenotic form. This may be due to its productive or retractive character, spasm (even though this is of little importance), insufflation, or resistance to the point of the gastroscope, which properly handled can be overcome. Although the stenotic form indicates that a generic diagnosis can be made of the neoplasm, it is impossible to define its type and its extent toward the base. The upper limit is revealed by the stenotic ring.

In the presence of the nonstenotic form the endoscope will determine whether the growth is of the nodular productive type, the productive ulcerated type, the ulcerated type, the cirrhotic type or a type resulting from various combinations. In the ulcerated forms the behavior of a neoplasm situated on the lesser curvature is usually different from that of a neoplasm on the greater curvature or mainly on the walls (as in the case of simple ulcer). The rigidity of the walls of the lesser curvature and the greater firmness of the submucosa at that level do not permit displacement of the *mucosa over and around the lesion.*

It is of the greatest interest to the surgeon to define exactly the highest limit of the tumor so that he may know whether there exists enough material for an anastomosis. This is important, since the asportation of the stomach is a technic that is still not entirely systematized.

When the results of roentgen examination and gastroscopic examination were compared it was noted that roentgen study showed the existence of a lesion not detectable by the endoscope. One must bear in mind that lesions situated on the lesser curvature, from the angulus to the pylorus or in the immediate subcardial area present difficulties, since technical vision is much obstructed, first by the contour of the lesser gastric curvature with the angulus, second by the closeness of the walls to the reflecting prism. This is true of all lesions, no matter what the type.

If conclusions regarding the gastric walls and the lesser curvature from the angulus to the immediate subcardial region are confirmed

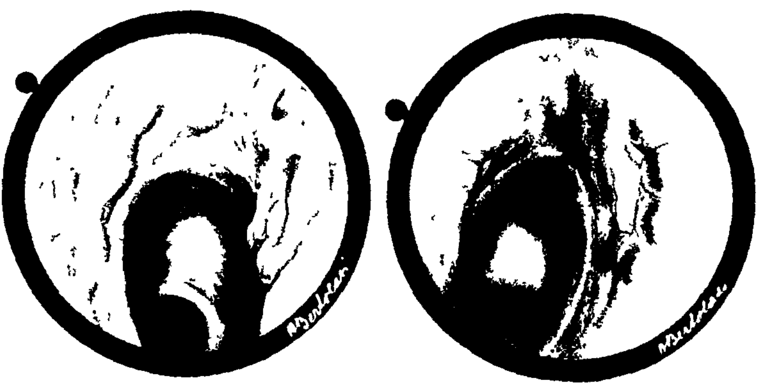

Fig. 1.—*Left,* hypertrophic ulcerative gastritis. *Right,* gastric ulcer of the lesser cu re

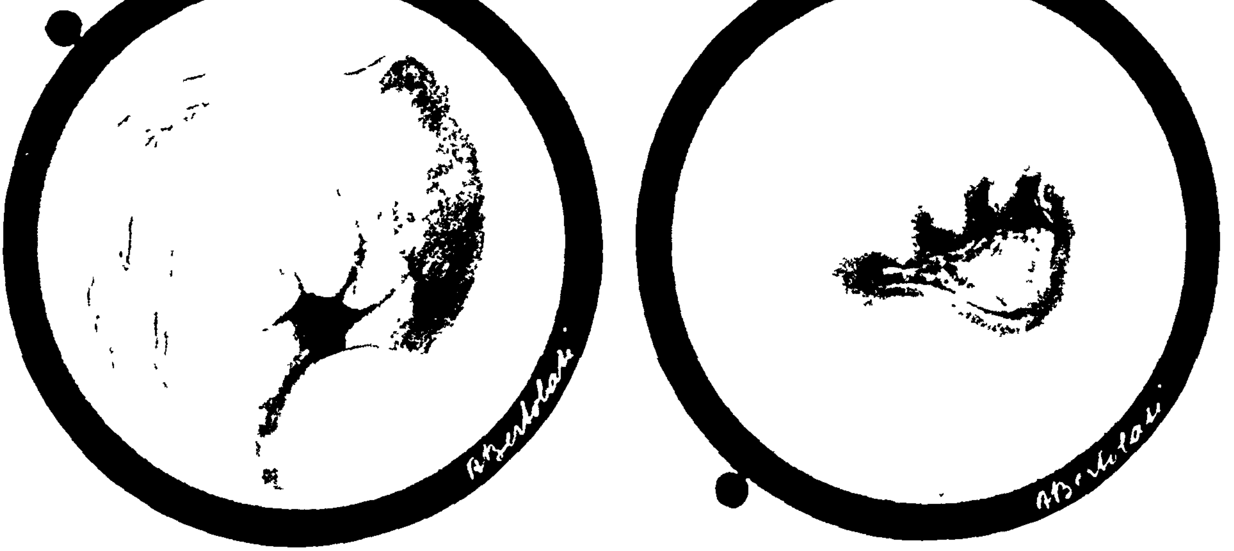

Fig. 2.—*Left,* stenotic carcinoma at the angulus. *Right,* stenotic carcinoma of the gastric body.

by endoscopic but not by roentgen examination, the latter must be repeated, and this time it should be directed toward exact location of the neoplasm. This is difficult, but it is necessary for full observation of the lesion.

Collaboration should be emphasized, for it brings immense returns in the diagnosis of neoplastic disease. It becomes absolutely necessary if one wishes to obtain an early diagnosis of any of the various forms of gastric carcinoma (especially prior to its invasion of the ganglions), thus enabling the surgeon to perform a really radical gastroectomy.

The flexible gastroscope raised many hopes when it was discovered in 1932, but these hopes were soon dispelled by repeated failures. At the same time, many valorous roentgenologists were laying the foundation for an exact diagnosis of early neoplasms. Finally, a step in the right direction was taken with the introduction of the pharmaceutical test meal. This makes use of the retractable sclerosis of the muscularis mucosa and submucosa, which show, even in the early stages, convergence of the plicas and a certain rigidity. These signs, however, are not always pathognomonic. Gastroscopic examination is therefore highly desirable, for it enables one to settle any doubts without waiting for the results of roentgen examination which as a rule is delayed to some extent and causes delay in intervention. In the case of a slowly developing neoplasm, several months would be necessary to verify the alteration by roentgenogram; but if the growth is rapid, a fortnight's delay may be fatal. It is known, for example, that in that special form of muco-erosive carcinoma, according to Gutman, roentgen examination results in a picture very difficult to interpret. Gastroscopic study, on the other hand, provides a positive diagnosis, as I have personally observed in a recent typical case.

POSTOPERATIVE EFFECTS

In the last twenty years the number of persons who have undergone operations on the stomach has gradually increased. Some patients, discharged as surgically cured after a certain period, complain of a variety of symptoms. All surgeons know the extreme difficulty of an exact diagnosis of pain following gastrectomy, since the test meal examination does not give an answer beyond the possibility of doubt. Roentgen examination also, for various reasons, encounters obstacles undifferentiated by a barium meal at the level of the lesser curvature of the stomach and the jejunal loop.

It is obvious, then, that endoscopic examination is important. It must indicate primarily whether there is gastritis, to which type it belongs, and to what extent it is present—whether it is limited to the anastomotic cavity

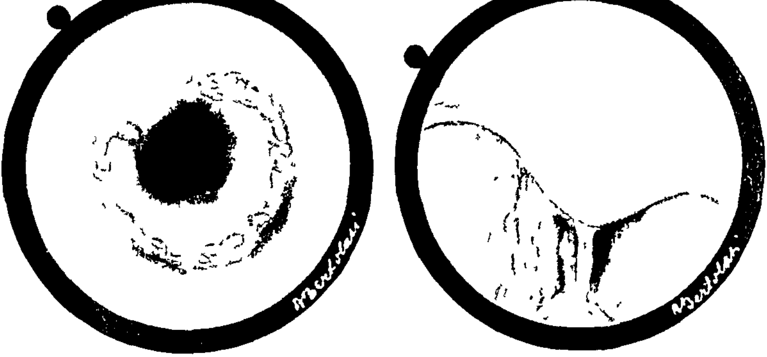

Fig 3 —*Left* ulcerative carcinoma of the angulus *Right,* productive carcinoma of the gastric body

or extends throughout the remaining portion of the stomach and the jejunum Judging from the patients I have examined the results indicate that it is not correct to attribute a process of doubtful chronic gastritis to disturbances observed in a patient who has been operated upon I have been able to prove that gastritis does not develop from gastrectomy unless it was present before the operation However, when, instead, the endoscope and macro microscopic examinations had previously demonstrated hypertrophic gastritis, after a certain postoperative period I noticed either the continuation of the lesion, its disappearance or its transformation to an atrophic form

After gastroenteroanastomosis hypertrophic gastritis is more frequent, apparently depending on the site and conformation of the anastomotic cavity As yet I have had no direct experience in the endoscopic identification of peptic ulcer

In one fifth of my reexamined patients (three to eighteen months after operation) I have noted some catgut not absorbed at the level of the stomach The catgut was either two stitches at the left angle of the stomach or a long stitch pulled for some distance by the posterior suture Later I observed this on the anterior side, since it was placed there by the continuous extramucosal method These threads cause chiefly a stomatitis of noticeable degree with various disturbances that affect the general health Some surgeons intercede by means of gastrotomy and the removal, in cases of stomatitis caused by silk, of the silk threads involved, which naturally clears up the postoperative symptoms

In the case of catgut, intervention is not suitable, since catgut is not so likely to fester as is silk The addition of hydrochloric acid to the patient's food will dissolve the catgut which the organism was unable to absorb

It is not inopportune to note that only the endoscope is capable of indicating the presence of nonabsorbed threads Only endoscopic examination can reveal eventually, the cause of the various postoperative disturbances that affect some patients in this field of surgery

In patients who complained of the characteristic symptom known as "dumping stomach," I discovered an anastomotic cavity with highly developed edema I do not know what relation there is between this local manifestation and the subjective and objective phenomena observed in the patient Is the edema a gastric manifestation of general hypoproteinemia, or is the latter limited to the gastric lesion? It is certain that intense localized edema in the anastomotic cavity makes the passage of food through the gastric parts of the jejunal loop more difficult

Less plausible is the hypothesis offered by some to explain the "dumping syndrome"—namely, that the symptom is referable to a precipitous emptying of the stomach, with abnormal distention of the jejunal loop or with hypoglycemic effects following an exaggerated discharge of insulin (thus taking into account both the "dumping syndrome" and the postprandial hypoglycemia). The problem deserves more thorough discussion, but the endoscopic report is absolutely necessary for an answer.

Some patients complain of postoperative pains, but the causative factors are not referable to the stomach. It is entirely possible that they are due to the formation of stones in the gallbladder. Since roentgen examination cannot discover their presence, one is limited in most diagnostic procedures to excluding cholecystitis; also, the cholecystographic picture in a patient who has undergone resection depends strongly on the presence of stones in the gallbladder. However, even in such cases gastroscopic examination excludes, with certainty, all lesions arising from the gastric stump and the anastomosis, thus drawing attention to cholecystitis as the real cause of the patient's complaint.

SUMMARY

This study sets forth the conclusions drawn from 410 gastroscopic examinations of patients with gastroduodenal lesions who underwent surgical treatment shortly afterward.

The surgical purposes of endoscopic examination of gastroduodenal ulcer are stressed. This method provides the surgeon with a better idea as to the kind of surgical intervention that is most likely to ensure the best postoperative results. The study should be aimed at ascertaining, first of all, what type of gastritis is responsible for the lesions.

In cases of suspected neoplastic disease, gastroscopic examination often enables one to avoid a useless laparotomy. However, in the case of a gastric neoplasm already present, close cooperation between the roentgenologist and the surgeon will be profitable when the lesion is still in the initial stage.

A study is made of some of the causes accounting for the troubles which usually affect the patient submitted to an operation on the stomach. Emphasis is laid on the contribution of endoscopic examination toward solving a number of problems. Postoperative gastritis, nonabsorbed threads, "dumping stomach," postprandial hypoglycemia and postresection cholelithiasis may be discovered or verified by this means.

RIASSUNTO

Vengono esposte le conclusioni tratte da 410 gastroscopie eseguite su pazienti che, affetti da lesioni gastroduodenali, subirono un intervento chirurgico a breve distanza dall'-esame stesso.

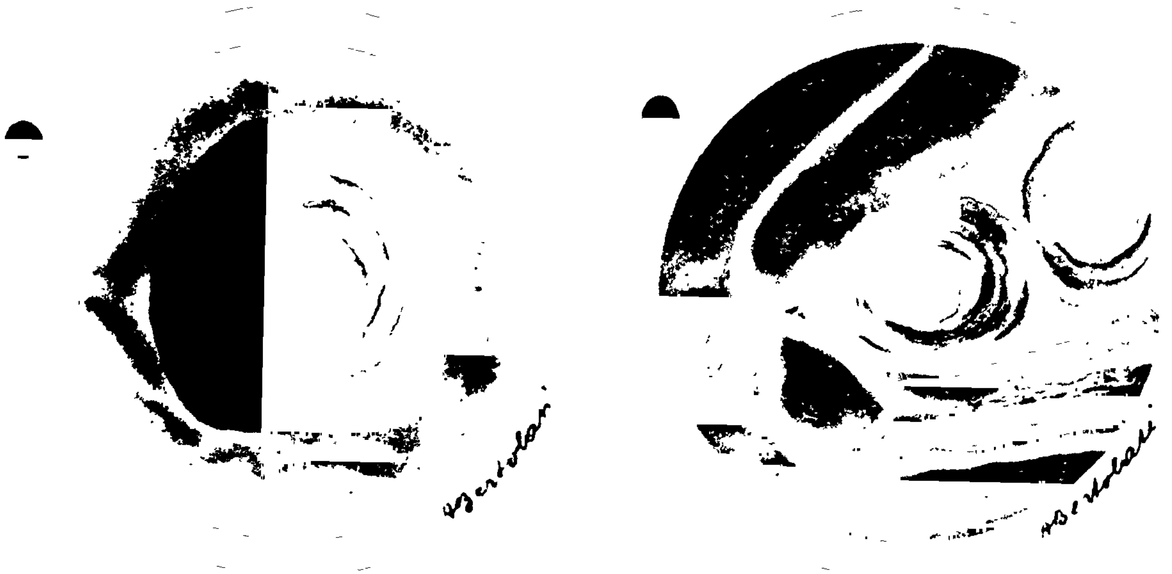

Fig. 4.—*Left*, scirrhus. *Right*, catgut thread in a resected stomach.

Si prospettano le finalità chirurgiche che deve perseguire un esame endoscopico nelle ulcere gastroduodenali ravvisando nei processi di gastrite, concomitanti la soluzione di continuo, la ragione prima di tale esame la risposta endoscopica indirizzando il chirurgo verso quel tipo di intervento che assicurerà un miglior decorso postoperatorio

Si prospetta poi la possibilità gastroscopica di evitare inutili laparatomie nelle neoplasie gastriche già sviluppate propugnandosi per le forme all'inizio una stretta collaborazione col radiologo

Vengono infine considerate alcune cause dei disturbi che affliggono gli operati di stomaco ponendo in evidenza quale è l'apporto che l'endoscopia può dare alla soluzione di problemi che sono tutt'ora allo studio (gastrite postoperatoria=fili non riassorbiti=dumping stomach=ipoglicemia postprandiale—colelitiasi dopo resezione)

RÉSUMÉ

On expose les conclusions tirées de 410 gastroscopies effectuées sur des patients qui souffrant de lésions gastro duodénales avaient subi une intervention chirurgicale peu de temps après l'examen même

On parle ensuite des buts chirurgicaux que doit poursuivre une examen endoscopique des ulcères gastro duodénaux et on affirme que les processus de gastrites concomitantes la solution de continuité, devraient etre considerés l'objet principal de l'examen susdit, la réponse endoscopique étant celle qui orientera le chirurgien vers le type d'intervention qui aura les meilleures suites post opératoires

On parle encore de la possibilité offerte par la gastroscopie d'éviter des laparotomies inutiles dans les néoplasies gastriques déjà dévelopées et préconise, au commencement, une collaboration étroite avec le radiologue

On considère enfin quelques unes des causes des dérangements dont souffrent les opérés de l'estomac en mettant en évidence la contribution de l'endoscopie dans la solution des problèmes encore a l'étude (gastrite post opératoire—fils non ré absorbés—dumping stomach—hypoglycémie—postprandiale—cholélithiase après résection)

RESUMEN

Se exponen las conclusiones sacadas de 410 gastroscopias ejecutadas sobre pacientes que, afectados por lesiones gastro duodenales, han sido sometidos a intervención quirúrgica poco tiempo después de este examen

Se exponen las finalidades quirúrgicas que debe alcanzar un examen endoscopico en las ulceras gastroduodenales, considerando en los procesos de gastritis concomitantes la solución de continuidad y la razón primordial de tal examen, la contestación endoscopica que haya de aconsejar al cirujano hacia aquel tipo de intervención que pueda asegurar un mejor curso postoperatorio

Se exponen además la posibilidad gastroscopica de evitar inutiles laparatomias en las neoplasias gastricas ya desarolladas, recomendandose para las formas al inicio una estrecha colaboración con el radiologo Se consideran también algunas causas de las molestias que afligen los operados del estomago, poniendo en evidencia cual es el contributo que la endoscopia puede dar para la solución de problemas que estan todavia estudiandose (gastritis post operatoria—hilos no reabsorbidos= dumping stomach=Hipoglicemia post -comidas=calculos de la vesicula de la hiel después de la gastrectomia

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Pilonidal Cyst:

Treatment by a Uniformly Successful Method

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UNFORTUNATELY, numerous so-called recurrences have led to the belief that treatment of a pilonidal cyst by removal is frequently ineffective. Since surgical cure of this disease often has been wanting, treatment by electrodesiccation, actual cautery and chemicals has been employed in the hope that better results might be obtained.

If any doubt exists as to the wide incidence of this lesion, reference should be made to the literature on the subject (Masson;[1] Hayter;[2] Dulligan;[3] Wharton;[4] Newell;[5] Horsley;[6] Owen;[7] Fansler and Anderson;[8] Saleeby and McCarty[9]). Some authors, from experiences during the recent war, gained the impression that active pilonidal cysts were especially prevalent among servicemen. Anderson,[10] who first described this interesting lesion, noted that the patient was a man, and Warren,[11] who reported cases in 1854, described the true nature of the cyst. Theis and Rusher[12] have given an excellent account of its historical background, and the embryologic aspects have been discussed adequately many times (Hodges;[13] Conrad;[14] Tourneau and Herrmann;[15] Mallory;[16] Aschoff;[17] Pauthiou;[18] Stone;[19] Weinstein;[20] Thomason;[21] Smiley;[22] Gage;[23] Fox;[24] Kallet;[25] Zieman[26]). Essentially, a pilonidal cyst is an embryologic rest of ectodermal origin, usually occurring in the portion of the neurectoderm last to be detached from the skin.

Although it is generally agreed (Breidenbach and Wilson[27]) that trauma does not play a role in the production of pilonidal cyst, trauma is an important factor in the production of inflammation and clinical symptoms (Goodsall and Miles;[28] Jones;[29] Cupp[30]). In this regard it should be noted that pilonidal cysts, although they occur nearly always in the sacrococcygeal region, may also occur higher along the spine (Stoner;[31] Smith;[32] Sharpe;[33] Walker;[34] Hamby;[35] Boldrey and Elvidge[36]).

TREATMENT

Sclerotherapy (Crookall;[37] Maillard;[38] Cutler and Zollinger;[39] Block and Greene;[40] Biegeleisen[41]) and irradiation (Smith;[42] Turell[43]) have been suggested. In general, two surgical methods of treatment are available: (*a*) block excision and open packing (Beck;[44] Bookman;[45] Anderson;[46] Rogers;[47] Rogers and Hall;[48] Rogers and Dwight;[49] Warman;[50] Silverman;[51] Kallet;[52] Pickett and Beatty[53]) and (*b*) excision of the cyst and some type of closure (Camp and Polites;[54] Ottenheimer;[55] Dunphy;[56] Larkin;[57] Cattell and Stoller;[58] Gage;[59] Morter;[60] Burgess;[61] Tendler;[62] White[63]).

Rogers,[64] in 1933, observed that whether cysts were treated by excision and open packing or by some method of primary closure the average healing time was about two and eight-tenths months, while Woldenberg and Sharpe[65] stated that, in 72 per cent of all cases in which primary closure was employed, healing was complete in fourteen days. A similar figure, with 92 per cent of cures, was reported by Ferguson and Mecray.[66] Kleckner's[67] review of 4,699 cases, in which one third of all cysts treated by primary closure recurred, contrasts with the excellent results from this method reported by Gage[68] and McKirdie.[69] The general recurrence rate of 25 to 30 per cent (Weeder;[70] Kooistra[71]) appears to be an accepted misfortune.

Excision and primary closure, besides involving the possibility of wound breakdown and infection, obliterates the normal internatal cleft. Wounds closed in this manner frequently tear open owing to the absence of an internatal groove, which normally becomes shallow on sitting (Brezin, Love and Lawrence[72]); therefore, various methods of overcoming tension on the lateral flaps have been suggested

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(Lahey,[3] Cattell,[4] Swinton and Hodge,[5] Shute, Smith, Levine and Burch[6])

Buie, a surgeon of unusual experience, has obtained good results by a type of marsupialization procedure after incision of the cyst and its sinuses and removal of the overhanging edges, a method similar to that suggested later by Goldbacher[8]

The long period required for epithelium to replace the granulation tissue of the cyst bed is shortened by the method suggested by Colp[79] and modified by MacFee[80] and Van Alstyne[81] With this technic a block excision of the area is performed, followed by suture of the skin flaps to the deep fascia, leaving an interval of perhaps 1 cm for epithelial replacement

The impression could not be avoided, however, that the Colp MacFee Van Alstyne method unnecessarily removed normal skin and thereby increased the time required for development of epithelium over the defect The time is proportionate to the diameter of the ellipse removed Therefore, in each of 315 patients, many of whom had been operated on previously, frequently several times by the open and closed methods, I carried out a simple excision under spinal or intravenous anesthesia Without preliminary staining, an incision is made from the external opening of each sinus to the central cyst the procedure to this point being identical with the initial step in Buie's method Whether the picture at this juncture is a single incision (in the case of a series of midline sinus openings) or a cruciate or stellate incision (if lateral sinus openings are present), the bed of the incision consists of granulation tissue

Without the removal of any skin, the opened cyst and its communicating tracts are cut out Hemostats are applied to any vigorous bleeding points, and the entire fatty or fibrous bed, corresponding in shape to the original incisions (i e the general shape of the cyst and its ramifications) firmly packed for hemostasis with gauze moistened in warm solution of sodium chloride for five minutes As Holman[82] has said patience and pressure may supplant the use of ligatures In none of my cases has a bleeding vessel required ligation, any hemostats being removed gently before closure Although Meleney[83] and Scott[84] have encouraged the use of sulfonamides in pilonidal cystectomy wounds, I have not employed oral, parenteral or local chemotherapy

No buried sutures being present, I then carry out a modified Colp MacFee Van Alstyne type of closure, suturing only the skin edges of each side to the sacrococcygeal fascia in the midline region of the cyst bed (or to the gluteal fascia in the case of lateral ramifications), using interrupted fine silk or cotton sutures placed about 1 cm apart The sutures are so placed that, when they are tied the edges of the skin in the midline cleft and in the adjacent clefts formed by the lateral beds are approximated The tying is postponed until all sutures have been placed When the operation is complete, a stellate closure is apparent if a stellate lesion was present, the suture lines being a pattern of the original cyst and its ramifications The normal internatal cleft in the region of the main cyst is preserved and minor clefts, of course, are present where adjacent sinuses were present Dry gauze dressings are placed lightly in the clefts, and a protective, fairly thick gauze dressing is applied and held in place with sufficient adhesive tape, no attempt being made to approximate the buttocks

This method by which the normal internatal cleft is preserved offers potential avenues of egress for infected exudate from under the skin flaps Patients are permitted to walk sit and go about their normal duties on the day of operation The wound is dressed on the third or fourth day in a manner similar to that used for the first dressing Sutures are removed as they appear to require removal, a few may be taken out on the fourth or fifth day, while some may be retained for eight or ten days By preserving all skin, tension on the suture lines is avoided and separation of skin flaps from the deep fascia does not occur

To avert development of an infected cyst like area where skin flaps approximate each other in especially hairy persons roentgen depilation about ten or twelve days after operation has been employed in several cases With this method, complete healing has taken place within two weeks in every case There has not been any recurrence in this series some of the cases having been reviewed as long as six years after operation

SUMMARY

A method of treatment of pilonidal cyst by accurate excision of the cyst and its ramifications, without sacrifice of skin, with preservation of normal internatal contour, and permitting discharge of the patient from the hospital to normal duties on the day of operation, is described. The method is not new, but is presented because of its success, without exception, in 315 cases of pilonidal cyst, in many of which the patients had undergone one or more previous operations.

RÉSUMÉ

On décrit une méthode de traitement du kyste dermoïde par une excision soignée du kyste et de ses ramifications sans sacrifier la peau en conservant l'aspect extérieur normal et en permettant au malade de retourner à ses occupations le jour même de l'opération, sans séjourner à l'hôpital. La méthode n'est pas nouvelle, mais on la présente en raison de ses succès ininterrompus dans 315 cas de kyste dermoïde. Dans plusieurs de ces cas, les malades avaient déjà subi auparavant d'autres opérations pour cette même lésion.

RESUMEN

Describe el autor un método para el tratamiento del quiste pilonidal mediante la extirpación completa del quiste y sus ramificaciones sin sacrificar la piel, conservando el contorno normal, y permitiendo que el paciente sea dado de baja del hospital y retorne a su vida cotidiana el mismo día de la intervención. El método no es nuevo, presentándolo el autor por el éxito, sin excepciones, que con él ha tenido en 315 casos de quistes pilonidales, en muchos de los cuales los pacientes habían sufrido previamente una o más intervenciones.

RIASSUNTO

Descrive un metodo operatorio che consente un'escisione accurata delle cisti pilonidali e delle loro ramificazioni senza sacrificare la cute e i contorni dell natiche, permettendo in tal modo ai pazienti di lasciare l'ospedale il giorno stesso dell'operazione. Questo metodo non e' nuovo; ma e' riportato in esteso, perche' ha condotto in 315 casi (molti dei quali precedentemente operati) ad un completo successo.

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New Instruments

A New and Improved Anoscope

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TO the dictum "Practice makes perfect" might be added a corollary: namely, that practice aided by the active intelligence gravitates toward perfection. Whatever practical knowledge and skill one would normally acquire over a quarter of a century of exclusive practice of proctology has been translated into the new and improved anoscope described here.

This instrument, the "Anuscope" (see illustration) is designed to render possible a painless, easy examination of the anus and rectum. This is accomplished by a smoothly rounded and gently dilating tip. The anoscope is furnished with a cheap source of illumination, an ordinary fountain pen light battery. This is used as a battery handle, and the lamp used may be turned on as with a pen light. The lamp used is a standard cystoscope lamp, and by it the field is abundantly lighted. The obturator is furnished with a thumb ring which permits the thumb of the examining hand to hold the obturator after withdrawal and to replace it immediately if necessary.

The cost of the instrument has been greatly reduced by simplification of the parts. Batteries for the handle can be obtained at any five and ten cent store, since they are ordinary pen light batteries.

In the hands of my colleagues and myself, the instrument has proven to be exceptionally well designed for its double purpose:

1. It makes possible an easy, painless examination of the anus and the lower part of the rectum.

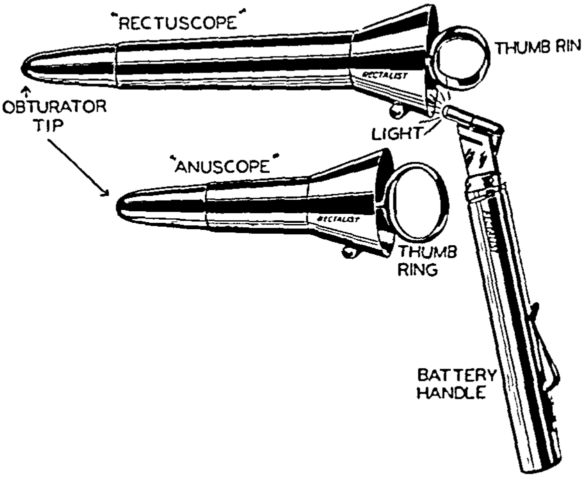
2. It is especially well adapted for the injection treatment of hemorrhoids. As the instrument and the illumination are all controlled with one hand, the other hand is thus left free to be employed in the actual injection of hemorrhoids or treatment of the parts under observation.

A longer rectoscope designed along the same lines is available for examination for the upper rectum. It fits the same battery handle as does the anoscope.

RÉSUMÉ

L'auteur présente un nouvel instrument "l'Anuscope" de Montague (voir l'illustration), désigné pour que le proctologiste puisse faire un examen facile et sans douleur de l'anus et du rectum. "L'Anuscope" fonctionne avec une légère batterie de stylo lumineux ordinaire, qui n'entraine pas de frais importants.

L'auteur considère que son instrument est particulièrement bien adapté pour l'injection employée dans le traitement des hémorroïdes. On peut aussi avoir un instrument plus long, le "Rectuscope" dont on se sert pour examiner la partie supérieure du rectum. Les deux in-



Instruments described.

struments fonctionnent avec le même manche contenant la batterie

RESUMEN

El autor presenta un nuevo instrumento, el "anoscopio" de Montague (véase la ilustración), diseñado para permitir al proctólogo hacer un examen facil e indoloro del ano y del recto El anoscopio funciona con una pequeña batería eléctrica del tamaño de una pluma estilográfica, y por lo tanto, el costo de su manejo es relativamente economico

El autor considera que su instrumento esta especialmente adaptado para el tratamiento por inyecciones de las hemorroides Puede también utilizarse otro instrumento mas largo, el "rectoscopio," para examinar la parte superior del recto pudiendo ensamblarse ambos instrumentos al mismo mango que contiene la batería citada

RIASSUNTO

Presenta un nuovo strumento, il cosidetto Anuscopio (vedi fig), che consente al proctologo di esaminare in modo facile e non doloroso l'ano ed il retto L'anuscopio funziona con una piccola batteria tascabile, di modo che il suo uso non e' costoso

L'A ritiene che lo strumento sia particolarmente indicato per la cura delle iniezioni sclerosanti delle emorroidi Uno strumento piu' lungo, il rettoscopio, serve per l'esame delle parti alte del retto e' inseribile sullo stesso manico che contiene la batteria

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Editorials

The Enigma of Destiny

Every so often, in the writings of our professional colleagues, there crops up a heartening bit of evidence that doctors are still concerned with the larger issues of life and philosophy as well as with the minutiae of scientific knowledge Such a bit of evidence is to be found in a small brochure written by Dr. Vincent A. Lapenta, which, although not a new publication , contains much food for thought and many points of departure for further speculation. Subtitled "Philosophic Musings of a Surgeon-Chemist," the essay undertakes to set forth the author's reasons for being convinced that there is more in the phenomenon of life than meets the eye, even the penetrating eye of the microscope.

The premise is stated without equivocation. "If science is not to prove a false matter, it must deal in the final analysis with metaphysics and philosophy " The argument that follows is interesting as an exercise in logic and no less interesting for its scientific tone. Deeply interested in chemistry and its potentialities. Dr. Lapenta points out that to this science materialists have always turned for their chief ammunition. as witness the triumph they displayed when Wohler made his important discovery that urea. an organic compound. could be synthesized from ammonium cyanate The author takes exception to this triumph. believing it to have no basis whatever. "Even if it were true that life originated by chance from the inorganic world. the origin of matter would still need to be explained. . . . These negative propositions involve metaphysical assertions requiring greater will to believe than is required by any philosophical concept postulating a creation and a creator." Chemical discoveries thus far assert. rather than deny, the existence of a supreme force still undefined, which may as well be called God as anything else. The essay concludes with a memorable quotation from Slosson:

> Continuously, in an out, over and under, circle the elements; never at rest, never the same, all bent on the mission appointed them before the creation of the world Never faltering, never deviating, each atom follows the path through empty space marked out for it millions of years ago; a path so complex that no mathematics can calculate it for the thousandth part of a second, yet so regular that no variation can be detected in years. Back and forth without stopping moves the shuttle of matter, eternally weaving the living garment of God.

Since the "whence" of life has yet to be discovered, the "whither" must also remain entirely in question. It is good, perhaps, on the whole, that we do not know. Ignorance, in an intelligent mind, is a dynamic creative force. Out of it, and the overwhelming thirst to overcome it, have emerged all the great discoveries of the ages. Even if the question of the origin and ultimate destiny of all life must remain forever unanswered, the quest for the answer is like the search for the Grail; it informs all life with meaning, vitality and purpose.

Whatever the issue, if ever an issue is known. it is a sad mistake to call cogitation a waste of time. A quest that fails in one direction may succeed in a dozen others; this is the common experience of all who have achieved. The cry for "More light! More light!" may never bring us to the full noon of realization. but it can keep our heads above the shadows and our feet on a surer path. When men of learning and skill forget to think, the reservoir of ideas will soon run dry.

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*The Metaphysics of the Ultimate Reality By Vincent A Lapenta Reprinted from The Hexagon of Alpha Chi Sigma Vol 19, No 3, 1928

Youth and Professional Integrity

THE International College of Surgeons, which from the beginning has conceived of itself as a teaching organization no less than a universal medium of communication and mutual aid among men of established accomplishment in the scientific world, has recently, by the creation of Junior Membership in its United States Chapter, flung the portals still wider to talent, brains and worth while achievement. This new rank of membership admits to our goodly company men whose powers have yet to be fully realized and who naturally look to their seniors in the profession for guidance.

To this guidance we are committed by every decent and generous law of professional fellowship and humanity. There are few among us who cannot recall at least one "bright particular star" among our own early teachers and mentors, and what his recognition meant to us at the beginning of our careers. But we were lucky if we found one or two such guides. The mere press of work together with the fact that comparatively few organizations then provided such opportunities deprived more than one of us of associations that would have been a supreme source of inspiration, encouragement and wisdom.

Today, when we realize as never before how vitally important it is to have surgeons nurtured and trained according to the highest possible professional skills and standards, our obligation to the young men among us is plain. The United States Chapter, therefore, in setting up requirements for Junior Membership has placed no barriers in the young surgeon's path. The requirements for this membership are minimal. The candidate must be a graduate of an approved school of medicine and must have completed a surgical training program consisting of a minimum of one year's approved internship and two or more years' approved residency. He must provide satisfactory evidence that he is ethically, professionally and morally qualified for Junior Membership in the International College of Surgeons. He will be elected as a Junior Member when his application has been approved by the Board of Examiners of the United States Chapter. Junior Members are expected to apply for Associate Membership within three years after their election to Junior Membership. Application for Associateship must be made to the Board of Examiners of the United States Chapter.

With these requirements, which place no strain upon either the purse or the personal life of any candidate, we hope and expect that many new faces will be seen at future Assemblies of the Chapter. To all young men who come we extend a hearty welcome and the assurance that to the best of our abilities we will share with them what we have learned. They are the heirs of our labors and we have more than a casual interest in their inheritance.

New Horizons

By the Editor

A Vanishing Race

Professor Alexander Lipschutz of Santiago, Chile, who in 1946 led a scientific expedition to Tierra del Fuego to investigate the physical characteristics and cultural status of the Fuegian Indians,* reports this race as "on the way to complete cultural and biological extinction." He ascribes this decline chiefly to the influence of the Europeans who followed the Fuegian trail in Tierra del Fuego and who, although they fell heir to, and made use of, Fuegian culture in the development of the region, did not desire the survival of the Fuegians as a racial unit. Miscegenation with whites has greatly altered the Fuegians, of whom only a handful, so to speak, remain.

Basically, however, Dr. Lipschutz finds this ancient people, especially the Ona Indians, anthropologically similar to other American Indians, pointing out the persistence of Mongoloid Asiatic traits in both. This resemblance, of course, has long been accounted for by various theories of migration, advanced in the effort to answer a long-discussed question—that of the origin of human life in the Western Hemisphere. In the Americas no fossils are to be found that would indicate the existence here of primeval man; migration, therefore, would seem the logical explanation, though the manner and source of that migration is still a matter of argument.

According to Professor Lipschutz, the Fuegians are not only a vanishing but a greatly misunderstood race. Statements of Darwin and other investigators, he believes, have given rise to a general impression that these tribes are hardly human. On the contrary, Professor Lipschutz and his associates arrived at the conclusion that the Fuegians are "in no way different from other human beings in character or intelligence." This impression was confirmed by the civil and military authorities of Tierra del Fuego, as well as by the white farmers who are native to the region. "The social relations between the whites and the Fuegians are good, and are like those between different social strata in a racially homogeneous ethnos." Professor Lipschutz quotes Gusinde, an authority on Fuegian culture, to the effect that this race adapted itself admirably to its geographical surroundings and produced a native culture on as high a level as a difficult environment allowed.

The intrinsic interest of these observations is considerable, the philosophic and historical interest still greater. The appearance and slow extinction of any single race of mankind upon the earth has always a touch of mystery about it; it becomes, when viewed *sub specia aeternitatis,* another of those veiled mutations of destiny that perpetually alter and magnify life and its problems. The seeker after ultimate truth, no matter how hard he pursues it, is constantly brought up against the realization that many goals lie still beyond his reach. Where did the Fuegians come from in the first place? Nobody knows. Why, in the course of history, are they doomed? The answer is silence.

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*Royal Anthropological Society: Man 48:7-8 (January) 1948.

Chapter News

Brazilian Chapter The inauguration of the Brazilian Chapter of the International College of Surgeons was held on the evening of Sept 30, 1949, in the auditorium of the Public Library in in São Paulo

Prof Dr Pedro Calmon, Dean of the University of Brazil, Rio de Janeiro, presided Among the others who were present and who participated in the ceremonies were the following

Prof Dr Carlos Gama
Prof Alvaro Guimarães, Filho
Dr Sinesio Rangel Pestand
Dr Jose Ayres Netto
Dr Jose Avelino Chaves
Dr Sebastião Hermento, Junior
Dr Pedro Ayres Netto
Dr Manuel Marcondes Machado
Dr Oscar Cintra Gordinho
Dr Virgilho S Carvalho Pinto
Dr J A Saores Batista
Dr Eurico Branco Ribeiro
Dr Lucas Machado
Col Vital Baz, Brazilian Army
Major Villa Longa, Brazilian Air Force

The meeting was opened by Dr Calmon who introduced Prof Carlos Gama, President of the Brazilian Chapter of the International College of Surgeons Prof Gama gave a brief history of the College, and stated that the purpose of the organization is primarily *to further the advance of the art and science of surgery throughout the world* He then read the Constitution and Bylaws of the Brazilian Chapter and pointed out that 'this organization is founded to create a common bond among the surgeons of the world and to promote the highest standards in surgery throughout the world without regard to race creed or color'

Prof Gama further stated that the College has been founded upon the principle set down by Louis Pasteur 'Science belongs to no nation, for knowledge is the patrimony of humanity, the torch which enlightens the world

After the address by Prof Gama, the members read, in unison the Pledge of the College

The diplomas were then conferred by Prof Calmon The following officers were installed

Prof Dr Carlos Gama President
Dr J Avelino Chaves President Elect
Dr Sebastião Hermeto Junior Vice President
Dr Virgilho Alves Carvalho Pinto Secretary
Dr Jose A Soares Batista Ass't Secretary
Dr Eurico Branco Ribeiro Treasurer
Dr Oscar Cintra Gordinho, Ass't Treasurer

The following regents were installed

Prof Dr Gustavo Gouvea, Rio de Janeiro
Dr Fernando Luz, Filho, Salvador, Bahia
Dr Luiz Tavares, Recife, Pernambuco
Prof Dr Guerra Blessamann, Porto Alegre
Prof Lucas Machado, Belo Horizonte
Prof Mario de Abreu Curitiba Parana
Dr Elpidio V Cannabrava Triangulo Mineiro, Minas
Dr Josas Castro Prado Londrina, Parana
Dr Manoel Marcondes Machado, Campinas São Paulo
Dr Arthur Domingues Pinto, Santos, São Paulo
Dr Tinoco Cabral, Ribeirão Preto, São Paulo

Prof Gama introduced Prof Calmon who addressed the assembly on the history of medicine and surgery The meeting then adjourned to the Casa Anglo Brasileira for dinner and a business meeting

Italian Chapter Plans for the Second Annual Assembly of the Italian Chapter International College of Surgeons, to be held on May 27, 28 and 29 1950, at Venice and Padua are outlined by Prof Dr Antonio Bobbio, Secretary, as follows

Saturday, May 27, morning
  Travel from Venice to Padua by car
  Opening session in the Aula Magna of the University of Padua
  First Scientific Meeting
  Luncheon
Saturday, May 27, afternoon
  Second Scientific Meeting Surgical Clinic University of Padua
  Tour of the city
  Return to Venice by car
Sunday, May 28, morning
  Third Scientific Meeting Civil Hospital Venice
  Tour of the city
Sunday, May 28 afternoon
  No meetings scheduled
  Banquet at Torcello in the evening
Monday, May 29 morning
  Joint session of the Italo Swiss Society of Medicine and Surgery and the Italian Chapter of the International College of Surgeons at the Palazzo Ducale Venice
Monday May 29, afternoon
  Fourth Scientific Meeting

Austrian Chapter: At a recent meeting of the Austrian Chapter of the International College of Surgeons, the following officers were elected for 1950:

President: Prof. Dr. Hans Finsterer, Professor of Surgery, University of Vienna
Vice-President: Prof. Dr. Tacilo Antoine, Head of the 2nd Gynecological Clinic, University of Vienna
Secretary: Prof. Dr. Felix Mandl, Head of the Surgical Department, Kaiser Franz Josef Spital, Vienna
Treasurer: Prof. Dr. R. Oppolzer, Head of the Department of Surgery, Vienna Policlinic

Finnish Chapter: The degree of Honorary Fellow was conferred on Prof. T. Kalima, Professor Emeritus in Surgery of the University of Helsinki, at the Chapter meeting held on Sept. 10, 1949, in Tampere. At the same meeting Prof. Viljo Tuomikoski lectured on "Virilismus Adreno-Genitalis" and Dr. Eero Turpeinen on "Curare in Anesthesia."

The Finnish Chapter held its Annual Assembly on January 27. The following officers were elected for 1950: President, Prof. Dr. T. E. M. Kalima, Helsinki; Vice-President, Prof. Dr. Väinö Seiro, Helsinki; Secretary, Dr. Atso I. Soivio, Helsinki, and Treasurer, Prof. Dr. M. V. Vannas, Helsinki.

The Seventh International Assembly

of the

International College of Surgeons

Will Convene

at

Buenos Aires, Argentina

August 1-5, 1950

For information, write:

All Nations Travel Bureau

725 First National Bank Building 38 S. Dearborn St., Chicago

Official Travel Representatives, International College of Surgeons

New Books

The Epitome of Andreas Vesalius Translated by L R Lind New York The Macmillan Company, 1949

The character and personality of Vesalius rank high in interest among the great medical figures of the past His famous *Epitome,* called by Professor Lind 'a masterpiece of condensation" is here presented in admirable English the original Latin text with its remarkably fine illustrations being appended The late Logan Clendening, to whom the translation is dedicated, said of the *Epitome* Here are the very words of the master himself freed from controversial arguments long since outmoded Here indeed is the epitome of one of the greatest works on science ever to be written one of the foundations of modern civilization'

The *Epitome* was first published in June 1543 It is a far cry from the medicine and surgery of that period to the vast and still expanding medical world of today The pioneer work of Vesalius in anatomy, which gave impetus to the first surgery based on a comprehensive knowledge of the human body, was done under such handicaps as would have discouraged most men misunderstanding persecution and danger were Vesalius daily bread That he persisted in spite of these barriers in his path the whole world has cause to be grateful

Something of the quality of the man as well as his grace as a writer may be learned from Vesalius' dedicatory letter to Prince Philip It is he pleads a situation wretched and unworthy of the greatest Emperors Kings and Consuls that, in the pursuit of studies so varied the harmony of the human body should be constantly concealed that man be completely unknown to himself, and that the structure of instruments so divinely created by the Great Artificer of all things should remain unexamined since it is by the function of those instruments that those things which we look upon as most and almost solely, important are brought to pass Again at the end of his foreword to the reader Vesalius concludes with engaging hopefulness 'Farewell and use these my efforts as frankly as they are offered

That Vesalius has a strong accessory artistic talent is obvious for the illustrations of the *Epitome* are his own work Their quality is such as to make this book almost a collector's item Though it will naturally find its greatest audience in the medical profession its interest is quite as strong for any one outside this field who cherishes any affection for the culture of the past

Chirurgica Urgenzia By S Teneff Minerva Medica, 1949 Pp 1025, 482 illustrations

This excellent new Italian work on surgery which carries a foreword by Prof A M Dogliotti covers a great deal of operative territory Urgent and emergency procedures for injuries and diseases of the various body areas are described in detail illustrated pictorially, and arranged for ready reference The author is doubly qualified for his task, as are so many surgeons nowadays by a wealth of war experience in addition to his civilian practice and research

Great emphasis is rightly laid on the importance of an accurate diagnosis and a wise choice of procedure in any emergency or critical situation when time is of the essence if the patient is to survive Importance is given to the efficiency of surgical instruments and devices many of which are illustrated by photographs or diagrammatic drawings Preoperative measures and postoperative care are outlined The sketches of various operative technics deserve special praise

Early Carcinoma of the Uterine Cervix By Hansjakob Wespi New York Grune & Stratton Inc 1949 Pp 271, 95 illustrations With a foreword and survey by Walter Schiller

This concise book represents a very modern and fair minded attempt to evaluate on the basis of actual experience and observation the various known methods of diagnosing carcinoma of the cervix at an early stage of its growth Dr Schiller's extensive analysis of the problem with full attention to the many points of controversy associated therewith lays the groundwork well for Dr Wespi's elucidation of his own theories methods and experiences The colposcopic method is particularly emphasized

All methods outlined are correlated with a careful presentation of the pathogenesis of carcinoma and a study of the various forms of cervical epithelium as related to malignant disease The book ends with a clear statement of the author's conclusions and a list of 235 references to other authorities The illustrations chiefly photomicrographs with a few charts and line drawings are grouped at the end The material is well and lucidly presented and with due consideration of the fact that the ultimate problem of cancer remains so far from an adequate solution should become a valuable contributory factor in the world wide effort to solve it

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Official Travel Representatives. International Colleg sider the patient and his need Both Dr Fine and his patients are to be congratulated

Chicago Cook County Health Survey U S Public Health Service New York Columbia University Press, 1949 Pp 1317 16 illustrations, 178 tables

This massive report, the result of a comprehensive survey undertaken by the Federal Public Health Service in 1946 at the request of the mayor of Chicago and the board of commissioners of Cook County, covers all phases of public health sanitation, hospitalization and medical care in a large metropolitan area Water supply, milk supply, sewage and refuse disposal, housing vermin control and communicative disease control are described Facilities for school health dental health and mental hygiene are enumerated It is hoped that the collection of so many data in one volume will not only demonstrate what has already been done in the Chicago area but indicate new and improved ways of coordinating these efforts into a strong and integrated working program

The value of such a compendium as this is not, of course, confined to the area in which it is issued Most of what applies to the Chicago area will apply to similar areas elsewhere

The researcher interested in statistical data will find the book a gold mine of reference, with its nearly two hundred tabulations ranging from strictly medical to medicolegal, political, economic and industrial

Illustrations of Surgical Treatment By Eric L Farquharson Baltimore The Williams and Wilkins Company, 1949 3d ed Pp 391, 41 illustrations

It has been aptly remarked that, so far as teaching and memory value are concerned, one picture is worth ten thousand words of text This volume is a worthy point in evidence Although there are only 41 plates nearly every one of them is a multiple illustration, and all are so clear and so sagaciously chosen as to be memorable The total impression is of a comprehensive photographic presentation of all the major problems of orthopedic surgery, supplemented by textual explanations that are remarkable for their simplicity and lucidity As the late Sir John Fraser observed of the first edition, "Mr Farquharson has a reputation for ingenuity and it seems to me that this book is a confirmation of that opinion He has produced a volume which is in some respects unique"

Mr Farquharson's book is unusual not only for its ingenuity in presentation but for the diversity of its coverage Although the major emphasis is on orthopedics two sections are given over to the techniques of infusion and transfusion and there is a large appendix devoted entirely to instruments and appliance This information will be especially useful to students in preparing for their formal examination, since the successful classroom demonstration of such devices and their management is admittedly difficult

Handbook of Medical Management By Milton Chatton, Sheldon Margen and Henry D Brainerd Palo Alto, Calif University Medical Publishers, 1949 Pp 476

This small, compact book is exactly what its title implies a manual for quick reference It is composed entirely of outlines, tables and synopses of symptoms and treatment Great attention has been given to the tables of reference for physiochemical values, diets, height and weight, diagnostic tests, dosage of various drugs under different conditions, etc The outlines cover, in the briefest possible form all pathologic conditions and emergencies encountered in ordinary practice, each presents the symptoms, course, and recommended treatment Such widely used procedures as blood transfusion and gastric suction are explained There is a comprehensive section on poisons their action and their antidote

According to the authors' preface, the Handbook will be revised each year, in order that no new technic or discovery of demonstrable importance may be omitted

A Practice of Orthopedic Surgery By T P McMurray Baltimore The Williams and Wilkins Company, 1949 3d ed Pp 444, 191 illustrations

Here is a concentrated treatment of orthopedic surgery as applied to pathologic conditions and injuries other than fracture Fractures are not discussed because, says the author, "this subject is such a large and important branch of surgery that it deserves consideration in a separate volume" In this volume therefore, he confines himself to other aspects of his general theme, defining orthopedic surgery as the surgery of the locomotor system embracing the treatment of injury disease or deformity of the limb joint and spinal column" Emphasis is placed in the introductory chapter on the importance of taking into account not only the immediate correction but the possibility of later alterations due to growth or other factors

Tubercular, arthritic and neoplastic diseases of the bones and joints are discussed and illustrated in detail Peripheral nerve injuries, diseases of muscle and tendon and congenital deformities and dislocations are approached in the light of the most recent surgical knowledge The author is meticulous in his description of available corrective apparatus and of the criteria by which the orthopedist may evaluate the results obtained. The sections on spastic paralysis and osteitis deformans have special interest.

Mobilization of the Human Body. By Harvey E. Billig, Jr., and Evelyn Loewendahl. Stanford, California: Stanford University Press, 1949. Pp. 62; 25 illustrations.

The effectiveness of well-planned exercises in improving physical health and assisting convalescence has been made the basis of a short but pertinent work written in a simple, readable style and clearly illustrated with good photographs and line drawings. Dr. Billig recommends "progressive stretching" as a means of loosening contracted fibrous tissue and thereby relieving pain and various other discomforts. All of the exercises included have been tested and proved helpful. Problems of posture as well as various pathologic conditions have responded well to their use. The book will be welcomed by physicians, physical therapists, physical education teachers and all others concerned with prophylaxis and rehabilitation in this area.

A Textbook of Surgery. Edited by F. Christopher. Philadelphia: W. B. Saunders Company, 1949. 5th ed. Pp. 1550; 742 illustrations.

Ninety-eight distinguished surgeons contribute to this new edition of Dr. Christopher's well-known and widely used textbook on general surgery. With such a roster of recognized authorities brought together in one volume, the resulting work can hardly fail of distinction.

An important feature is the emphasis laid on etiology, pathology and diagnosis, which are discussed quite as thoroughly and meticulously as is surgical technic. The entire work is based on modern methods that have been tested and proved; debatable technics and those which have not been adequately evaluated as yet are omitted. Some thirty new sections have been added, each by a prominent specialist in the field. The book is well organized and illustrated and appears in a format whose excellence is commensurate with the work.

Autobiography of Dr. Robert Meyer. By Robert Meyer, with a memoir of Dr. Meyer by Emil Novak, New York: Henry Schuman, Inc., 1949. Pp. 126.

For a man whose name and achievements are known throughout the medical world, Dr. Meyer's autobiography is an extremely modest one. He calls it "a short abstract of a long life," and the book itself as nearly as terse as this subtitle. Its brevity and compactness, however, are so strongly in character with the man revealed in its pages that nothing of value is lost through this condensation.

Dr. Meyer was born in Germany in 1864 and died in the United States, of which he had become a citizen, in 1947. "I have had an exceedingly beautiful life," he says, "which would be worth living once more." Not many elderly men can say as much, even though their lives have been lived in comparative comfort and ease. That Dr. Meyer could say in spite of the fact that his later years were ravaged by Nazi persecution is evidence enough of his personal quality.

Robert Meyer's achievements in gynecological pathology, which included triumphs in writing, teaching and research as well as in therapy, are too well known to require enumeration here. His talents as a writer were obviously beyond the usual, and in his autobiography he reveals from time to time a dry, sometimes rather caustic humor that makes his life story as fascinating to the lay reader as to the physician. Dr. Emil Novak, who wrote the foreword and assisted in the preparation of the manuscript, quotes his whimsicalities repeatedly and with delight. In describing two pharmacists of the town in which he first practiced, Dr. Meyer observed, "One of them played the flute, and the other was also a little silly."

It would be cheating the reader to include more of these refreshing comments. Those who find pleasure in the contemplation of a fellow human being who was also a great doctor, but never lost the common touch; who suffered hardship and persecution, but was never embittered; who succeeded greatly but made little of his success and much of the joy of the struggle, will read Dr. Meyer's story with great satisfaction.

Abstracts from Current Literature

Ten Years' Progress in Ophthalmology Stund, C. G., *J Oklahoma State Med Assoc* 42:90, 1949.

Ophthalmology has kept astride with new and improved methods to preserve man's most precious possession—good vision. Trachoma, particularly in its devastating stages, is now much reduced in incidence and morbidity because of the sulfonamides. The intracapsular technic of cataract extraction has reduced the waiting period with poor vision until the cataract became mature, necessary during the decades when the extracapsular technic was in vogue. Many children with strabismus have their eyes straightened by operative and nonoperative means before they reach school age instead of waiting for a spontaneous cure. Retinal detachment, previously considered a hopeless catastrophe resulting in blindness, is now successfully treated by diathermic multiple puncture. The sulfonamides and antibiotics have revolutionized the treatment of many pathologic conditions. Among these may be mentioned gonorrheal ophthalmia and interstitial keratitis. Serpiginous ulcer due to the pneumococcus is now successfully prevented by more intelligent treatment of corneal foreign bodies and abrasions. Perforation of the ulcer with resulting loss of the eye is now prevented by the use of sulfonamides and antibiotics. External infections of the eye, such as orbital cellulitis, retrobulbar abscess and infection of the tear sac have had their severity modified. The anticoagulants have been life saving drugs in the treatment of cavernous sinus thrombosis. Roentgen rays and radium have been utilized in the treatment of certain eye conditions that were previously not responsive to known methods. The beta rays of radium emanation are now used in vernal conjunctivitis, pterygium and sclerosing conjunctivitis. Roentgen treatment has proved efficacious for angiomatosis retinae, retinitis proliferans, malignant disease and certain sulfonamide and penicillin resistant ulcers such as those caused by Bacillus pyocyaneous. A better understanding of the fundamentals of good results following corneal transplantation has been established. A reasonably healthy corneoscleral circulation is a primary requisite for operation. Contact lenses are now accurately fitted by means of molds taken of the patient's eyes and are usually made of plastic material. The solutions used in the wearing of contact lenses are less irritating and more optically inactive. Glaucoma remains the outstanding cause of blindness and the best advice the physician can give the patient complaining of visual difficulty is to see the ophthalmologist. Preschool visual examination and an estimate of vision and ocular conditions in general physical examination prove revealing in a great percentage of cases. As we strive to help man live longer we should strive to help him see.

ROLAND I. PRITIKIN

Vaginal and Ovarian Metastases from Hypernephroma Mutzloff, K. H., and Manlove, C. H., *Surg Gynec & Obst* 88:145, 1949.

A case is described in which a recurring tumor of the vagina was observed over a period of two years. The vaginal metastases were the first evidences of an unsuspected left renal hypernephroma. This case represents the twenty third instance of such a complication of hypernephroma. Usually the original site of the hypernephroma is in the left kidney.

M. T. FRIEDELL

Cystic Tumor of the Mesentery Simulating a Cyst of the Ovary dos Santos, F., *Ginecologia* 4:139, 1949.

Errors of diagnosis are frequently made concerning neoplasms that are considered to be attached to the ovary but on opening the abdominal cavity prove to be completely independent of the genitals. A case of cystic tumor of the mesentery simulating a cyst of the ovary is described. Laparotomy was performed and the tumor easily extirpated. When its capsule was opened a dense and cystic liquid was found and microscopically examined. The examination showed its parasitical origin (Bancrofti parasite) and this was confirmed by examination of the blood.

CARVALHO PINTO

Necrotic Jejunitis Fick, K. A., and Wolken, A. P., *Lancet* 1:519, 1949.

An endemic, severe and often fatal disease of the jejunum has been observed in northern Germany during the past few years. This disease is characterized by a sudden onset with severe pain in the upper part of the abdomen, nausea and vomiting. The pain is a little to the left side, and there are hyperesthesia and rigidity in the left upper quadrant. Circulatory collapse is marked. This comes on at an early stage and the patient may die within twenty four hours. Those surviving this stage show a bloody diarrhea or evidence of paralytic ileus. The sedimentation rate is high and the leukocyte count is increased. The disease must be differentiated from perforated ulcer, acute obstruction of the small intestine and acute pancreatitis.

In severe cases resection, exteriorization and the establishment of a fistula in the small intestine are recommended. Patients less severely affected may survive with conservative treatment.

The pathologic condition may be confined to one or more parts of the jejunum or may affect the whole of it. There are definite lines of demarcation between the normal and the diseased portions of the bowel. The affected area is sausage-like in appearance; it is rigid and has a bright red serosa bearing vertical striations.

Edema may be so marked as almost to occlude the lumen. Late in the disease there is definite necrosis, involving the mucosa and at times also the submucosa. Sloughing results in extensive ulceration. Perforation, peritonitis and hemorrhage often occur. If the patient survives the necrosis scar stenosis or peritoneal adhesions may lead to mechanical obstruction.

The cause of this disease has not been established. Many suggestions have been made but none proved. The most commonly accepted theory is that there is an invasion of the intestinal wall by normally nonpathogenic bacteria when resistance is lowered by a general change and restriction of diet.

J. O. Morgan

Clinical Experiences with Chlorophyll Preparations. Carpenter, E. B., *Am. J. Surg.* 77:167, 1949.

By stimulating tissue cells, chlorophyll exercises an indirect antibacterial activity against anaerobic infections.

In a period of nine months 127 patients were treated by chlorophyll preparations. Of the 74 with chronic osteomyelitis, many had already been submitted to operation and had received penicillin locally and parenterally. In 59 cases a thorough sequestrectomy was done, followed by instillation three times a day of 10 cc. of chlorophyll-penicillin solution through an indwelling catheter placed in the medullary cavity. The wound was packed loosely with fine mesh gauze. Delayed primary suture of the wound was done in five to eight days after removal of the catheters. Of the 59 patients so treated, 56 healed per primum. The 3 failures showed that the infecting organism was Pseudomonas aerogenes.

Twenty-nine patients with chronic osteomyelitis secondary to compound fracture were treated first with plain solution of chlorophyll applied directly to the wound. As gross infection diminished, sequestrectomy was done, with instillation of chlorophyll-penicillin solution. Rapid disappearance of four odor from the wound was a noticeable feature. Twenty-three patients showed prompt healing. Additional surgical treatment was necessary for 6.

Nine decubitus ulcers in paraplegic patients were treated with plain chlorophyll solution applied as a wet dressing. As soon as the gross infection subsided, a thick layer of chlorophyll ointment approximately ¼ inch thick was applied. The results were most satisfactory.

Six patients with varicose ulcers who had failed to respond to the usual treatment were selected. In each, a thick coating of chlorophyll ointment was applied to the ulcer and gauze sponges were applied over it and secured in position by a pressure bandage. Healing was noticeably rapid.

R. N. Cooper

Encephalic Tumoral Metastasis and Tumors of the Nervous System as a Cause of Metastasis. Gama, C.: *Neurobiologia* 12:1-34, 1949.

The concept of metastasis is here broadened to include cases in which tumors in the vicinity extend to the nervous tissue through lymphatic or other channels, as well as by metastasis to the meninges. Furthermore, there were included also 4 cases of primitive brain tumors with metastasis to the spinal cord, as they presented all the characteristics of the tumors under discussion. In this broad sense there are 18 cases of metastatic tumor of the nervous system treated by the author. Taking as reference the probable route of invasion of the neural axis, the metastatic tumors were distributed in three groups: (1) cerebral metastasis (11 cases), by way of the blood stream; (2) invasive tumors of the brain (3 cases), through lymphatic channels, and (3) spinal cord metastasis (4 cases, by the arachnoid route). With reference to the total sum (733) of brain tumors (692) and spinal tumors (41) treated by the author, the metastatic growths in the nervous system represent 2.6 per cent of the brain tumors and 2.45 per cent of the central nervous system tumors. Distributed according to their histologic nature, these were: carcinomas, 67 per cent; hamangioglastomas, 16.5 per cent; medulloblastomas, 5.5 per cent; hypernephromas, 5.5 per cent; and sarcomas, 5.5 per cent. Classified by point of origin, they were: mammary glands, 28 per cent; lungs, 17 per cent; base of skull, 11 per cent; cerebellum, 11 per cent; cerebrum, 5.5 per cent; scalp, 5.5 per cent; liver, 5.5 per cent; uterus, 5.5 per cent; and adrenals, 5.5 per cent. The postoperative duration of life varied between six month and four and one-half years in the 8 patients who could be followed.

Carvalho Pinto

Cancer in the Lactating Breast McLellan P G *Connecticut S M J* 13 47, 1949

Carcinoma of the lactating breast though found to have an incidence of 2 per cent in previous large series, was found by the author to have an incidence of 0 9 per cent from records of 1 359 cases of breast carcinoma at the Hartford Hospital and an incidence of 0 8 per cent as reported by the Connecticut State Department of Health in an analysis of 5,213 cases of breast cancer

Eleven of the 14 cases reported by the author had unfavorable outcomes Two patients were still living after eight and sixteen years respectively and 1 died fourteen years after her original mastectomy of brain metastases These latter 3 were given many years of life through early and adequate radical mastectomy proving to the authors that such intervention is indicated when no obvious contraindication exists

The author then postulates that the prognosis of carcinoma of the lactating breast is definitely poorer than that of other breast cancers because of (1) increased vascularity and (2) increased estrogenic stimulation in the pregnant patient He then suggests that if the patient seems operable, and after radical mastectomy and pathologic study would appear to have a favorable prognosis no further treatment may be necessary

Subseqeunt pregnancies are not deemed a serious threat to the other breast and termination of pregnancy is not considered an essential part of routine treatment Preoperative irradiation is frowned upon in these cases

J W Brady

Ligation of the Common Carotid Artery Rogers L, *Lancet* 1 949, 1949

Ligation of the common carotid artery may produce complications either because of immediate cerebral ischemia or because of delayed thrombosis or embolism from the site of the ligature The author reports a series of 19 cases in which he has ligated the common artery without mishap combined with a review of recently published cases He states without hesitation that in a reasonably fit person, provided the tolerance test is satisfactory, it is safe to divide the common carotid artery

Division of the artery not only severs the sympathetic fibers, abolishes spasm and prevents recanalization but reduces the liability to delayed embolism since there is no pulsation in the distal part of the severed artery

The accompanying vein is not ligated or severed since electro encephalography at the time of occlusion Rogers shows that cerebral anoxia is increased if the vein is ligated at the same time as the artery

The tolerance test is done to ascertain the competence of the circle of Willis and to give rise to a collateral blood supply Every ligation of a carotid artery, consequently, must depend primarily on the absence of disturbance of cerebral circulation and on the presence and patency of this anastomotic circle

It is safer to ligate the common rather than the internal carotid artery, because the blood flow is thereby materially reduced but not completely abolished There is a free anastomosis across the midline of the neck between the two external carotid arteries The blood flow is therefore reduced about half but not abolished

Charles C Abbott

Liver Function Rossiter R J *Univ Western Ontario M J* 19 1 1949

The author presents a complete study of liver function and describes in detail the various tests and their interpretations The paper is especially valuable in the differentiation of damage to liver parenchyma and the differentiation from biliary obstruction He also includes tests to be employed in patients with both conditions The paper is to be recommended as one of the most complete that has been published in recent years on liver function and biliary obstruction

Leigh F Watson

The Effect of Tetraethylammonium Chloride on Peripheral Blood Flow Veal J R Shadid J N and Jamison W L, *M Ann District of Columbia* 28 113 1949

Veal and his associates describe changes in venous pressure in the extremities Their experience with tetraethylammonium chloride has fallen short of expectations when compared with the after effects of a novocaine block of the sympathetic ganglions

Changes in the venous pressure were used to measure the efficiency of tetraethylammonium chloride as compared with lumbar sympathectomy By this means the authors were able to show that small doses of tetraethylammonium chloride 7 mg per kilogram of body weight may temporarily increase the peripheral blood volume The increase is seldom maintained more than twenty minutes However, associated with reduced arterial pressure there is a decrease in the peripheral blood flow Elevation of the blood pressure by epinephrine will increase the blood flow In sympathectomized extremities tetraethylammonium chloride will reduce the peripheral blood flow, apparently because of a fall in blood pressure

M T Friedell

Palliative Operations for Carcinoma of the Pancreas. Sanders, R. L., and Porter, C. H., *South. Surg.* 15:383, 1949.

The desirability of radical operation for carcinoma of the pancreas is not questioned, but the results are so frequently disappointing that this method of treatment should be reserved for the most favorable cases. Several points are made to substantiate this opinion: 1. A positive diagnosis is difficult even at operation, and the risk of resecting a benign lesion is not to be ignored. 2. A large percentage of the patients are in the older age groups and are frequently debilitated; therefore they tolerate such a formidable operation poorly. 3. Technical difficulties are great, and postoperative complications are numerous. 4. Physiologic conditions are greatly altered by pancreatic resection and can be only partially corrected by drugs and other measures. 5. The operation carries a mortality rate of from 20 to 50 per cent. 6. The length of the survival period following radical resection does not differ materially from that following a palliative procedure. 7. Only a small number of three-year to five-year cures have thus far been reported. For these reasons it is felt that side-tracking operations are still the best recourse in the majority of cases of malignant pancreatic disease.

The diagnosis of carcinoma of the pancreas is difficult and often impossible without biopsy. Painless jaundice is by no means characteristic of all cases of this disease. In many instances the condition is neither painless nor manifested by jaundice. Vague epigastric fullness and distress, nausea, vomiting, loss of appetite, weight and strength are frequently the early symptoms. These symptoms should prompt the physician to make an exhaustive survey of the case. The jaundice resulting from these lesions usually develops rapidly; it is associated with pruritis, a high icteric index, an enlarged liver and a distended gallbladder. The jaundice is constant, and chills and fever are conspicuously lacking. Pain is quite variable. It may be described by the patient as a dull ache in the epigastrium or pain of a deep and boring quality, extending through to the back. Others have cramping and colicky pains. In most cases the pain, like jaundice, is constant. Laboratory studies are, on the whole, of little value. Roentgenologic examination may reveal displacement of the stomach or deformity of the duodenum.

A study of 81 cases of carcinoma of the pancreas is reported. The outstanding symptom in 63 patients was jaundice; pain was the chief complaint of 43, and a palpable abdominal mass was present in 42 cases. In 14 patients of this group the disease was believed to be too far advanced for exploration; 17 underwent explorations only, and 50 underwent some type of palliative operation. Of the 67 operated upon, 48 had carcinoma of the head of the pancreas, 9 had lesions of the pancreatic body or tail or both, and in 10 the growth was diffuse. The procedures carried out were cholecystojejunostomy, cholecystogastrostomy and choledochoduodenostomy. Since 1937 cholecystojejunostomy has been done almost exclusively in these cases. The technic of this operation is least difficult, and complications are infrequent. The total operative mortality rate was 8 per cent. The duration of life after operation was twenty-five days to two and one-half years. The average length of life was seven months.

Symptomatic relief following side-tracking operations is aften excellent. The jaundice clears, itching subsides and minimal digestive disturbances are experienced.

J. O. Morgan

Spontaneous Perforation of the Oesophagus. Scholefield, J., *Brit. Med. J.* 1:348, 1949.

Two cases are presented of rupture of the undiseased esophagus, seen at the West Middlesex Hospital in Isleworth, England. In the second case the patient was restored to health by prompt surgical intervention. A plea is made for early diagnosis, since the majority die in forty-eight hours if untreated. Of some 60 patients whose cases are reported in the literature, at least 3 have survived without operation, and there have been cases reported of late drainage followed by cure in patients who have localized the spreading infection.

Vomiting is the presenting feature in almost all reported cases. Apparently the sphincter at the cricoid level fails to relax, and the esophagus tears at the lower end. Tears may also follow crushing injuries to the abdomen or occur during convulsions or after defecation. Autopsy uniformly fails to reveal any local disease of the esophageal wall to explain the rupture.

A longitudinal tear 1-8 cm. in length is found, usually in the left posterior wall. This is followed by agonizing pain and shock, with dyspnea and cyanosis commonly developing. Some relief may be obtained by sitting in bed. There may be boardlike epigastric rigidity. Two phenomena give the surest clues to the diagnosis—pleural effusion and (in many cases) surgical emphysema beginning at the upper level of the sternum.

Transpleural approach with primary repair of the tear and intensive use of antibiotics is recommended. Feeding is best handled by a nasal indwelling tube. The position of the tube should be checked, as it has been known to pass through the rent into the mediastinum.

W. R. Lovelace

Armamentarium

Blood Group Specific Substances. The "neutralizing" of Group O blood by the addition of Blood Group Specific Substances A and B produced by Sharp & Dohme of Philadelphia after the original development by Dr. Niels C. Klendshoj and Dr. Ernest Witebsky of the University of Buffalo Medical School makes blood of this group universally suitable for transfusion, it is claimed. Specific Substances A and B reduce the concentration of anti-A and anti-B agglutinins in Group O blood to a safe level so that the danger of untoward reactions is negligible. In a study of the results of this type of transfusion in 1045 routine cases during a period of five years, it was found that the total reaction rate, including pyrogenic, hemolytic, allergic and circulatory reactions, was even less than when homologous blood was used.

Radiation Counter. An instrument known officially as the Five-Fold Beta Gamma Hand and Foot Counter has been developed by RCA Victor, a division of the Radio Corporation of America, under the Atomic Energy Commission's program to safeguard those engaged in handling fissionable material. The instrument is said to measure radiation emanating from the hands and feet of persons working with radioactive substances as well as any background radiation that exists. Automatically subtracting the background count, it determines whether the worker can safely leave the radioactive premises or must undergo further decontamination bath.

Diodrast for Children. A new 20 cc. ampule of the radiopaque substance diodrast in 70 per cent solution is offered by Winthrop-Stearns Inc. of New York as a special children's size for use in roentgen visualization of the heart and great blood vessels. It is indicated particularly as an aid to the diagnosis of congenital cardiac disease.

The same distributors also offer a 50 cc. ampule of diodrast 70 per cent, which is extensively used for angiocardiographic study. The 35 per cent solution, especially valuable in urography (excretion tests), comes in ampules of 10, 20 and 30 cc. It is especially adapted to the differential diagnosis of renal malignant tumor, tuberculosis, calculi, hydronephrosis, nephroptosis, changes due to pregnancy and anatomic anomalies. Arteriographic, venographic and cholecystographic procedures also indicate the use of diodrast. For direct (cholecystographic) visualization of the gallbladder and bile duct during operation either the 35 per cent or the 70 per cent solution should be used.

Bactericidal Agent. The new compound Sulfamylon Streptomycin (Winthrop-Stearns, Inc., New York) is said to exert a stronger effect on Bacillus pyocyaneus than does any other similar preparation. It destroys all strains of bacteria commonly found in wounds, becoming effective after a short period of contact. The preparation was tested by Dr. W. R. Whitehouse, Dr. R. W. Kimbro and Dr. G. R. Wright of the Kimbro Clinic, Cleburne, Texas, in the following types of wounds, some of which were infected or heavily contaminated: perineal wounds (50 cases), ruptured appendix (4 cases), abdominal wounds (52 cases) and minor wounds of other areas (750 cases). Primary healing occurred in the perineal (episiotomy) wounds. In both infected and contaminated abdominal wounds only 2 showed evidence of slight serous drainage and none showed gross infection. There was no evidence of local or systemic toxic reaction, and healing occurred with minimal debridement.

Chloresium Inhalant. Chloresium Aerosol Solution, produced and distributed by the Rystan Company, Inc., Mount Vernon, N. Y., is said to fill a dual role in the inhalation treatment of infections of the respiratory tract. Used alone it exerts the same bland, nontoxic healing and deodorizing action in the respiratory tract that is associated with the topical application of Chloresium Ointment and Solution (Plain) to wounds, burns and dermatoses, additionally providing decongestion without rebound phenomena; and when used as a vehicle for penicillin it is said to enhance the effectiveness of the antibiotic by producing higher blood levels and maintaining them over an extended period, at the same time exerting its own therapeutic effect.

Mouse and Rat Cages. To provide greater durability under repeated handling and to prevent damage from gnawing by rodents, as well as rusting, the National Institute of Health of the United States Public Health Service, Bethesda, Maryland, and numerous other Government research departments have installed cages made of acrylic plastic (Plexiglas). Large numbers of laboratories in hospitals, universities and clinics throughout the country have also adopted these cages, which were developed by the Keystone Plastics Company of Swarthmore, Pa. The solid plastic walls protect the animals against drafts and sudden temperature changes. They are also designed to permit rapid, accurate research work. Each cage has an ample frosted area on one end for recording of data.

In Memoriam

JOSEPH ANTHONY COSCARELLO

M.D., A.I.C.S.

Dr. Joseph Anthony Coscarello, of Philadelphia, passed away Oct. 15, 1949. A 1924 graduate of Hahnemann Medical College, Dr. Coscarello specialized in obstetrics and gynecology. His graduate work was done at the Women's Homeopathic Hospital and the Broad Street Hospital, both in Philadelphia. He was a member of the American Medical Association, of Pennsylvania State and County Medical Societies and of the Homeopathic Medical Society of Philadelphia.

ONEY PERCY SMITH

M.D., A.I.C.S.

Commander Oney Percy Smith, Medical Corps, U.S.N.R., formerly of Troy, New York, passed away early in the new year. Commander Smith was a graduate of the College of Medicine of the University of Vermont. For seventeen years he held increasingly responsible posts on the surgical staffs of Samaritan Hospital and Troy Hospital. At the time of his death he was Senior Medical Officer at the Naval Training School at Richmond, Virginia. He was a member of the American Medical Association, the New York State and Rensslaer County Medical Societies and the Association of Military Surgeons of the U.S.A. He was also an Associate Member of the International College of Surgeons.

JOSEPH M. MORSE

M.D., F.I.C.S.

Dr. Joseph M. Morse of Brooklyn, New York, succumbed to cardiac failure on December 28, 1949. A graduate of New York University and Bellevue Hospital Medical College and a former Associate Surgeon at Beth Moses Hospital. Dr. Morse served also as Instructor in Anatomy, Experimental Surgery and Cadaver Operative Surgery at Bellevue. He was a member of the Kings County Medical Society and of its cultural division and also of the Brooklyn Thoracic Society.

SAMUEL DINWIDDIE WEAVER

M.D., F.A.C.S., F.I.C.S.

Dr. Samuel Dinwiddie Weaver of Dallas, Texas, *died on January 20, 1950, after a distinguished* career in general surgery. Dr. Weaver was a medical graduate of Tulane University and a former Fellow in Surgery at the Mayo Foundation. He also served on the surgical staff of the Mayo Base Hospital, A.E.F., in World War I. He was Chief Surgeon at the Baylor Hospital and later at the Woodlawn Hospital, and also a member of the Visiting Surgical Staff of the Parkland Hospital. He was Professor of Clinical Surgery at Southwestern Medical School and was well known as a contributor to surgical publications.

Dr. Weaver was a member of the American Medical Association, the American College of Surgeons, the International College of Surgeons, the Texas State and Dallas County Medical Societies, the Texas Surgical Society (of which he was a Past President), the National Gastroenterological Society and the Dallas Society of General Surgeons.

ARTHUR JOSEPH NEUMANN

M.D., A.I.C.S.

February 1, 1950, marked the passing of Dr. Arthur Joseph Neumann of Detroit, Michigan. Dr. Neumann attended the Detroit College of Medicine and Surgery and Loyola University, taking his medical degree from the latter. His postgraduate studies were conducted in Vienna, Edinburgh and Glasgow. He was chief of the surgical staff at Grosse Pointe Hospital from 1925 to 1940, and from 1945 to the time of his death held a similar position at Jefferson General Hospital, as well as that of visiting surgeon at Holy Cross, Mount Carmel and St. Mary's Hospitals. Dr. Neumann's practice was entirely surgical and devoted especially to abdominal surgery and gynecology. He was a member of the American Medical Association, the Michigan State and Wayne County Medical Associations, the East Side Physicians' Association, the American Association of Military Surgeons and the Association of Abdominal Surgeons and Gynecologists.

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Original Articles

Commissurotomy for Mitral Stenosis

THOMAS J E O'NEILL, M D, A I C S, ROBERT P GLOVER, M D,
AND CHARLES P BAILEY, M D, F I C S
PHILADELPHIA

DURING the past decade considerable interest has been developed in the problems offered by cardiac disorders Striking advances have been made in the surgical treatment of congenital abnormalities Complete restoration of anatomic relations has been accomplished in cases of patent ductus arteriosus, coarctation of the aorta, double aortic arch and other conditions The early severe disabilities associated with the tetralogy of Fallot have been greatly mitigated by the shunt operations developed by Blalock and Potts All have been accomplished with a respectably low mortality rate

These advances have represented technics employed on the several vessels adjacent to the heart and have been the accompaniments of improved methods of anesthesia, expanded physiologic knowledge and progressive surgical thought

It was inevitable and proper, therefore, that consideration should be directed toward surgical invasion into the heart chambers themselves A still more vast field lies ahead in the innumerable instances of chronic valvular defects, both congenital and acquired [1]

The mitral valve surpasses all the rest in its attractiveness for consideration It is the one most often crippled by disease, further, it is the most accessible

The responsible agent of disease is rheumatic infection, and either stenosis or insufficiency occurs as an end result Frequently the two are coexistent The stenotic valve lends itself more readily to surgical relief, and so naturally merits first attention

Following upon abatement of the infection, a definite series of events occurs The edges of the valve develop minute vegetations in a row along the line of closure of the leaflets Healing is accompanied by fibrosis and thickening of the cusp edges, and in the process the cusps are laced together or fused at both the lateral and the medial orificial limbs This line of fusion then properly becomes the commissures They immobilize the cusps and destroy the valve action A condition of stenosis exists At this point anatomic examination reveals the valve to be a truncated cone with its apex pre

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From the Thoracic Surgical Services of the Episcopal Hospital and the Hahnemann Medical College and Hospital

Read at the Fourteenth Annual Assembly of the United States Chapter International College of Surgeons Atlantic City N J November 1949

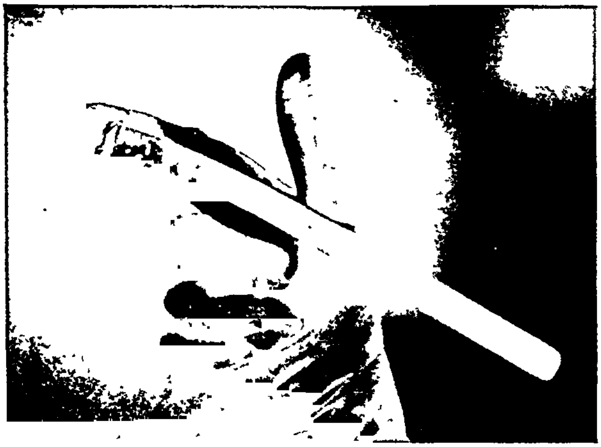

Fig. 1.—Instrument of recent design.

senting into the left ventricle and to consist of a thickened, fibrotic and even densely calcified ring, which is unyielding and is maintained in an open position through all phases of the cardiac cycle. The orifice is now greatly reduced in size, impeding the flow of blood.

This progression in stricture formation is reflected in the changing physical signs of the heart and matched by alterations in physiologic structure and function.

The left auricular pressure rises, and the amount of blood delivered to the left ventricle decreases. This results in a lowered cardiac output and in pulmonary venous hypertension. The increase in venous pressure is responsible for the associated dyspnea, cyanosis and hemoptysis. The pulmonary arterial system responds by elevation of the arterial pressure to values which are several times greater than the systemic arterial pressure, and so the right ventricle enlarges. This may occur to such an extent that the tricuspid valve becomes functionally incompetent, and its incompetence results in right auricular enlargement and systemic venous stasis. This may even reflect back to the left ventricle and result finally in enlargement of this chamber.

Various factors have hampered solution of the problem, even though the cause has been recognized and the effects clearly defined. Inadequate methods of anesthesia were a limiting factor in the success of early operative attempts. These have largely been eliminated. The original instruments were unsuitably designed. Many useful modifications are available at present (Figs. 1 and 2). No standard approach to the valve has been determined. In general, three approaches have been utilized at various times: left pulmonary vein, left ventricle, and left auricular appendage. Unquestionably the appendage appears best suited to the purpose, since it affords more working room, is more easily accessible without displacing the heart, eliminates entanglement in the cordae tendinae, affords easier palpation of the valve and provides an adequate biopsy specimen of cardiac muscle. In our opinion it should be ligated at its base in all cases, to eliminate the possibility of thrombus formation in its trabecular interstices.

More important than the foregoing considerations, however, was the acceptance of the concept that the solution necessitated merely enlargement of the orifice by whatever means were most convenient. This prevailed because of the erroneous belief that the resultant in-

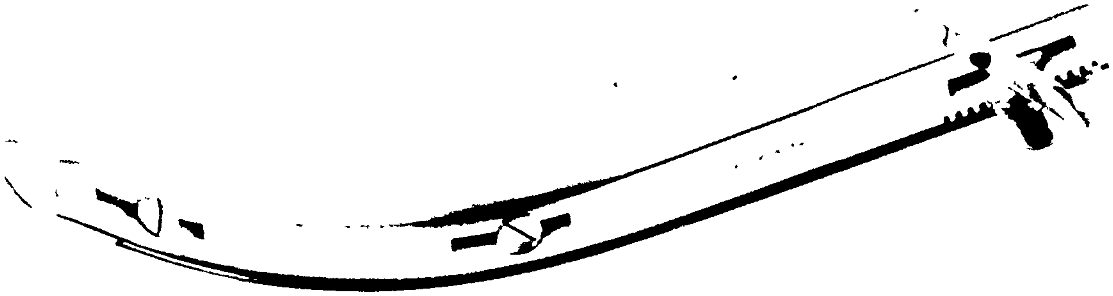

Fig. 2.—Instrument of recent design.

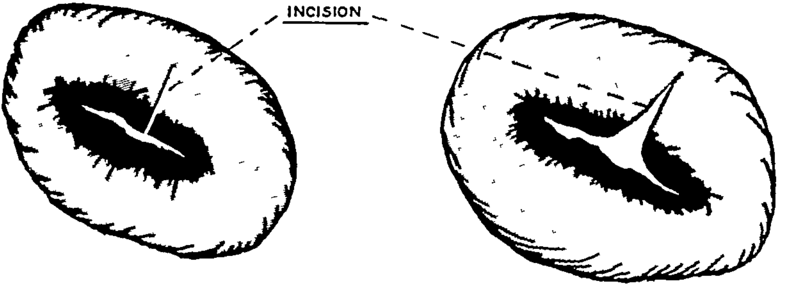

Fig. 3—Simple incision across anterior cusp (Cutler). Separation of cut edges inevitably produces uncontrolled regurgitation through anterior leaflet.

crease in regurgitation would be of no significance. We, on the other hand, maintain that *any* increase in regurgitation is detrimental and is often directly responsible for the high mortality rate attendant upon such procedures.

Therefore, a number of surgical maneuvers have been proposed and carried out. They may be classified, with slight variations, as follows:[2]

1. *Simple incision of a valve cusp (Fig. 3).*—This has consistently met with failure. A meager incision leaves the valve unchanged. One that extends through the scarred tissue will result in fatal regurgitation, especially if it is made in the anteromedial or aortic cusp.

2. *Excision of a portion of the mitral ring (Fig. 4).*—This was practiced by those who believed that transforming a stenotic lesion to a regurgitant one afforded the only hope of alleviation. With this concept we are in complete disagreement. The total evidence at hand to date refutes this idea.

3. *Digital dilation of the stenotic orifice (Fig. 5).*—Souttar[3] first utilized this procedure in 1925 with success in 1 case. Using the same maneuver, we have had one success in three attempts. The limitations of this procedure are twofold: First, there is no assurance that the tear will occur at the proper place. The ring will rupture at its weakest point, and if this happens to be in one of the cusps a predominant regurgitant lesion will result. Second, should it tear at one of the commissures, the length of the openings may well be inadequate; in other words, it may not split all the

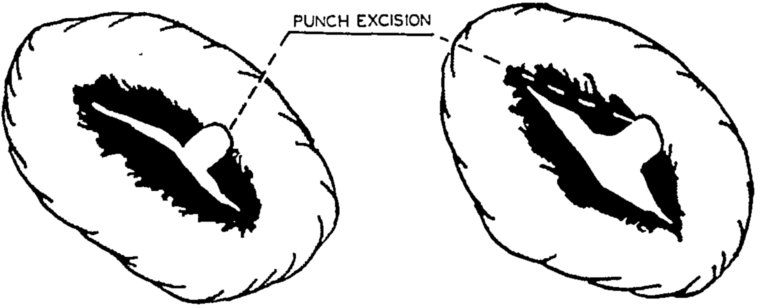

Fig. 4.—Punch excision of anterior valve leaflet (Cutler, Beck, Pribram, Smithy). Severe regurgitation through important anterior valve cusp is limited only by size of incisional defect.

way out to the flexible tissue and so is prone to fuse again.

4. *Valvuloplasty (Fig. 6).*—A procedure has been described by Harken by which portions of the stenotic valve ring are excised at the commissures. Production of limited or selective regurgitation is intended. Objections to this procedure might stem from the difficulties of adequate localization of the commissures solely by palpation with the valvulotome. It is also true that excision of the commissures would tend to produce more regurgitation than would incision.

5. *Commissurotomy (Fig. 7).*—This term was suggested to us by Dr. Thomas Durant of Philadelphia to designate the procedure we have employed in our endeavors to restore function to the mitral valve.[4] The operative technic has been simplified and lends itself to a definitive routine. The patient is anesthetized in the supine position. A submammary incision is made on the left and carried through the pectoralis muscle. Entrance is gained to the pleural space through the third rib bed. An incision is made in the mediastinal pleura and pericardium, anterior and parallel to the phrenic nerve. The distended auricular appendage now protrudes. A purse-string suture of heavy braided silk is placed about the base of the appendage but not made taut. A special clamp is closed on the base just distal to the purse string. The appendage is amputated just distal to the clamp. Now the special knife is inserted through this opening upon releasing the clamp. The knife is applied closely to the palmar surface of the index finger of the right hand by means of a second glove, which is fenestrated to allow protrusion of both the blade and the handle. Once the finger and the knife are in the left auricle, the purse string is temporarily tightened to prevent blood loss. A leisurely digital examination of the auricle is carried out, and the condition of the valve is determined. The direction of the commissures is located, and then the knife is applied to the anterolateral one and an incision is made out to the flexible area.

Marked rigidity of the valve at times necessitates cutting the posteromedial commissure. Should this be necessary, the finger is pronated and the proper incision is made in a similar manner. The knife is not withdrawn until digital examination is carried out again and the valve is noted to be satisfactorily functioning. Upon withdrawal of the finger and knife the purse string is tightly closed and securely ligated. This is reinforced by securely oversewing the cut edges with continuous arterial silk sutures. The pericardial incision is left open to drain into the pleural space so as to prevent tamponade. The pleural space is drained with a fenestrated catheter, and the thoracic wound is closed with interrupted cotton sutures.

In our more recent cases, manometer readings of pressures within the left auricle and the pulmonary artery were taken both before the valve was cut and after cutting. These have indicated an invariable lowering of the pressures.

RESULTS

Commissurotomy has been carried out on 21 patients up to the time of writing. Five have died as a result of the operation, and 16 have made satisfactory recoveries. Three of the fatalities have occurred among the first 5 cases in which the operation was done. Death occurred as a result of technical errors which, by experience, are now known to be preventable. The other 2 deaths occurred among the last 16 cases. The cause in 1 case was undetermined, and the patient in the other case died of progression of his disease, having shown a relatively high degree of regurgitation. In retrospect, we feel that this patient should not have been considered for the operation.

Of the 16 survivors, 12 have made excellent recoveries from their stenosis as judged by clinical and physiologic determinations; 3 have improved considerably, and 1 was operated on too recently to justify appraisal, aside from the observation that the postoperative course has been uncomplicated.

SUMMARY

Mitral stenosis and its treatment by commissurotomy are discussed in the light of the authors' personal experience. The physiologic changes associated with this disease are traced, certain therapeutic problems and handicaps pointed out, and a number of surgical approaches described. The authors favor commissurotomy, the technic of which they pre-

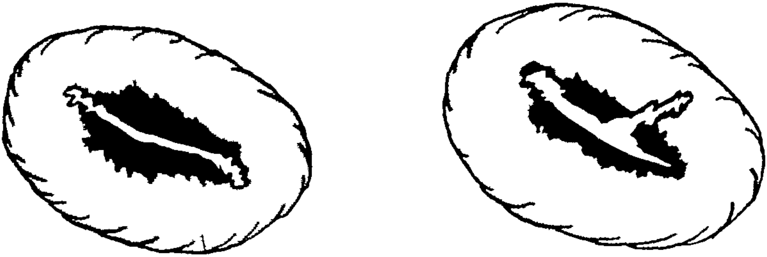

Fig 5—*Left*, tearing of commissures by simple dilatation (Souffar, Bailey, Brock) There is some restoration of valvular function *Right* inadvertent tearing of anterior valve leaflet during dilation, leading to fatal regurgitation

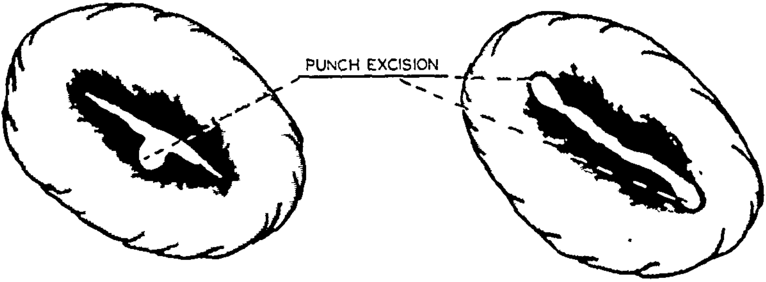

Fig 6—*Left*, "limited" or "selective" regurgitation (Harken) in punch excision of posterior valve leaflet *Right*, "valvuloplasty" (Harken), with punch excision of valve tissue at commissures Like commissurotomy, this can reestablish valvular function

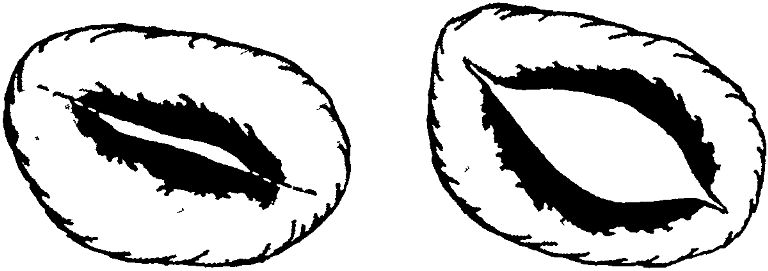

Fig 7—*Left* commissurotomy by direct finger approach ("digital vision") *No additional regurgitation is produced* *Right*, wide opening of a valve during ventricular diastole (0 7 of cardiac cycle) Because the valve is normally open, the cut edges are kept apart and do not tend to heal (dog, twelve months man, two and one half months)

sent in detail. Of 21 patients subjected to this operation, 16 made satisfactory recoveries. Most of the fatalities took place in the developmental stage of the operative technic and are attributed to technical imperfections and erroneous selection of patients. The authors express the opinon that the procedure as now performed is to be strongly recommended.

RÉSUMÉ

On discute la sténose mitrale et son traitement par commissurotomie à la faveur de l'expérience personnelle des auteurs. On décrit les changements physiologiques qui accompagnent cette maladie; on insiste sur certains problèmes thérapeutiques et certaines difficultés, et on décrit quelques possibilités de voie d'abord chirurgicale. Les auteurs sont en faveur de la commissurotomie, dont ils présentent, en détail, la technique.

Sur 21 malades ayant subi cette opération, 16 ont eu un résultat satisfaisant. La plupart des exitus survinrent à l'époque où la technique opératoire était en voie d'améliorations et sont attribués à des imperfections de technique et à une insuffisante sélection de malades. L'opinion des auteurs est que le procédé, ainsi mis au point maintenant, doit être fortement recommandé.

RESUMEN

Basándose en su experiencia los autores estudian la estenosis mitral y su tratamiento por la comisurotomía. Exponen también los autores las alteraciones fisiológicas asociadas a esta enfermedad y los problemas terapéuticos y desventajas relacionados con la misma, presentando con todo detalle la técnica de la comisurotomía, que los autores consideran como la intervención más recomendable.

De los 21 pacientes sometidos a esta intervención, 16 se restablecieron satisfactoriamente. La mayor parte de los accidentes mortales acaecieron durante la fase de desarrollo de la técnica operatoria, atribuyéndose a imperfecciones técnicas y a una selección errónea de los pacientes. Los autores opinan que ya puede recomendarse encarecidamente la técnica descrita, tal y como se practica en la actualidad.

RIASSUNTO

Discute la fisio-patologia e la cura della stenosi mitralica, giungendo alla conclusione che la commissurotomia rappresenta il procedimento chirurgico migliore.

Sopra 21 pazienti operati con la tecnica descritta dall'A. 18 sono guariti. La maggioranza degli esiti letali sono stati lamentati durante lo sviluppo della tecnica operatoria: sono quindi attribuibili o ad imperfezioni tecniche, o ad una scelta non appropriata dei pazienti.

Questo nuovo procedimento operatorio e' quindi vivamente raccomandato dall'A.

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Tuberculosis of the Greater Trochanter and Its Bursa

Treatment with Streptomycin and Surgery

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TUBERCULOSIS, either primary in the lungs or in any one of its secondary manifestations elsewhere in the body, still offers a challenge to human endeavor In spite of all present day efforts to achieve early diagnosis and effective treatment, the disease remains a therapeutic problem The fact that promin and, more recently, streptomycin along with standard or acceptable methods of treatment are beneficial in tuberculosis needs only to be mentioned

Tuberculosis of the greater trochanter and its bursa, as an entity, is not frequently seen The clinical as well as the roentgen diagnosis is often missed Recurrence after acceptable methods of treatment is common However, results obtained after total excision of the disease process combined with streptomycin therapy cannot be found in the literature There is likewise no appreciable literature on the effects of streptomycin therapy in bone and joint lesions when used both locally and intramuscularly with surgery Perhaps this is because of the infrequency of identical or similar bone lesions and the fact that the time required in follow up observations of these cases is of necessity prolonged It is for this reason that our two cases so treated were thought to merit attention

Historically, in 1870 Teale,[1] an English writer, made reference to the entity but not to its cause Hall reported 4 cases of tuberculous trochanteric disease in 1900 Weiting[3] is credited with having first described the entity in 1904 Thurston[4] described bilateral tuberculous bursitis of the hip with excision and good results in 1907 Cone[5] in 1911 and Swindt[6] in 1921 stressed trauma as an etiologic factor Clopton[7] in 1919 and Keith[8] in 1922 attempted an explanation for tuberculosis of the trochanter as having a predilection for its origin in bone rather than the soft tissue bursa, the greater trochanter having developed from an epiphysis (No explanation on this controversy is contemplated by us)

Although the disease is said to be rare in children, Perrin[9] reported a case of its occurrence in a 3½ year old boy Hauser[10] reported the case of a 5 year old child and Cholmeley[11] that of an infant 9 months of age Although the condition is most frequently seen in adults, no age group is immune to tuberculous osteomyelitis of the greater trochanter

Meyerding and Mroz[1] made an extensive study of this condition and reported 19 cases of their own, in 14 of which the right side was involved Tuberculosis was present elsewhere in the body in 73 per cent In 1940 Wassersug[13] stated that about 75 cases had been reported in the literature Of the patients in his series, 13 were male and 5 were female In 13 the left side was involved Seventy two per cent had tuberculosis elsewhere in the body Stuck and Hinchey[14] and others have stressed the importance of complete excision of the diseased process Rest of the part together with wholesome nutrition were the only adjuncts of proved supportive value at that time Donovan

Fig 1 (Case 1) —A large depressed scar with a draining sinus is seen on the lateral aspect of the right thigh

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From the Department of Surgery Provident Hospital Chicago

Fig. 2 (Case 1).—Tuberculous osteomyelitis of the right greater trochanter with sinus extension to skin.

and Sosman[15] urged keen clinical and roentgen acuity in order to diagnose calcium flecks in the bursa; this phenomenon is roentgen evidence of tuberculous bursitis. They emphasized the necessity for prolonged immobilization in a plaster cast; this view, however, was challenged by Wassersug[13] who stated that such immobilization is not necessary. Briede[16] elaborated on the condition from the standpoint of roentgen diagnosis, pointing out that a ragged edge of the greater trochanter with caseation or calcium deposits in the bursa is pathognomonic.

Judging from the foregoing references in the literature, tuberculosis of the greater trochanter is not common. A fairly exhaustive search has revealed only 12 case reports since Wassersug in 1940 referred to 75 cases up to his time, excluding his own 18. This makes a grand total of 105[4] confirmed cases[1] reported, including our own. The fact that we have had the opportunity to treat two such cases with local and intramuscular streptomycin combined with surgical excision was thought to be of interest and aroused our desire to review the literature on this subject.

REPORT OF CASES

CASE 1.—D. S., a man aged 46, entered Provident Hospital July 31, 1947. His chief complaint was of a draining sinus in the region of the right hip, of three months' duration. His clinical history dated back forty-one years, to a time when, at the age of five years, he fell on the right hip and this injury was followed by a purulent drainage from that area. The superficial tissues eventually healed. In 1927 the scar area broke down and again drained purulent material. Incision and drainage were instituted in Iowa. Eventual healing of the soft tissues followed. In 1944 another abscess formed. This time incision and drainage were done in California, with soft tissue healing after two months. His present illness which began in May 1947 brought him to us in July of the same year. Physical examination revealed a draining sinus over the right hip, from which could be expressed pus and a watery material. A large depressed scar presented on the lateral aspect of the thigh (Fig. 1). There was no unusual pain on weight bearing, little tenderness and no heat. A slight limp with no apparent limitation of motion was observed. No other contributory factors were noted. Our impression was that of chronic nonspecific osteomyelitis of the femur. Radiopaque mediums were instilled into the sinus tract and roentgenograms were taken. These revealed osteomyelitis of the greater trochanter with sinus extension to the skin (Fig. 2).

On August 5, with the patient under general anesthesia, the sinus tract was injected with methylene blue and the complete process excised, including the greater trochanter. The wound was irrigated with warm physiologic solution of sodium chloride and packed with 4 Gm. of sulfathiazole powder together with iodoform gauze. The latter was removed after two weeks. Plastic repair was

Fig. 3 (Case 1).—Plastic reconstruction of the right thigh.

done on the scar area at the time of operation (Fig 3) Penicillin (1,000,000 units) was given postoperatively in doses of 50,000 units every three hours intramuscularly, and 2 Gm of streptomycin were given daily in doses of 0 5 Gm every four hours for three days Ambulation was started on the fourth postoperative day The patient was discharged on August 21, sixteen days after the operation, without complaint Evidence of complete superficial healing, without drainage, was apparent in three weeks

The microscopic diagnosis was tuberculous osteomyelitis of the right greater trochanter and its bursa, unsuspected at the time of operation The thoracic roentgenogram showed no evidence of active tuberculosis in the pulmonary areas (Fig 4) Roentgen control study on April 7, 1948, showed no evidence of further destruction of the femur or involvement of the joint (Fig 5) The patient is now working and gaining weight, with no symptom of recurrence

CASE 2—P D, a woman aged 38, was admitted to Provident Hospital Feb 2, 1948 The chief complaint was of a cold abscess in the right hip, of six months duration There was a slight limp with no limitation of motion and no pain on weight bearing The patient had been tuberculous since 1943 and had undergone collapse therapy for five years in another institution Although there had been several bouts of hemoptysis tests of the sputum gave negative results Her husband had recently died of pulmonary tuberculosis A clinical diagnosis of tuberculosis of the greater trochanter and its bursa was made and confirmed by roentgenogram (Fig 6) The thoracic roentgen film showed pneumothorax on the right side (Fig 7) There was no appreciable loss of weight All other findings were essentially negative and noncontributory

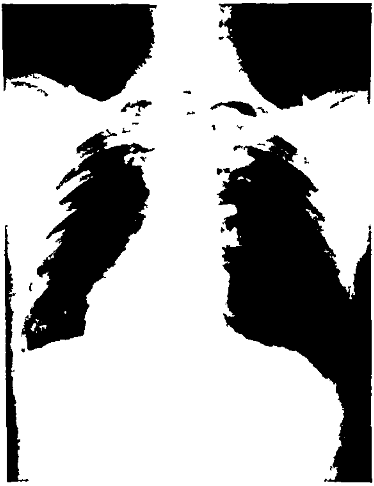
Fig 4 (Case 1)—Chest reveals no evidence of tuberculosis

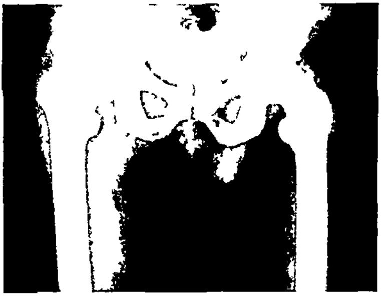
Fig 5 (Case 1)—Approximately eight months after operation No further destruction is noted

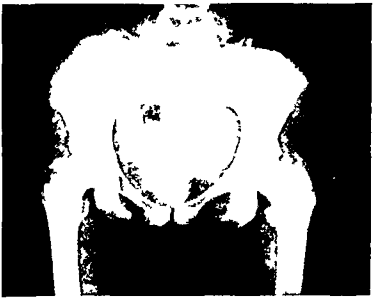
Fig 6 (Case 2)—Moth eaten defect in the right greater trochanter and calcium flecks in the bursa are seen

Streptomycin was administered, beginning on February 21 One half Gm was given intramuscularly every four hours in four doses daily On February 24, with spinal anesthesia the abscess was injected with methylene blue and the entire process excised, including a saucerization of the affected trochanter. The wound was irrigated with warm saline solution, after which the defect was packed with 4 Gm. of sulfathiazole and 2 Gm. of streptomycin, and an iodoform gauze packing was left in place for two weeks. Ambulation was started on the first postoperative day Streptomycin in doses of 0.5 Gm. was given every four hours postoperatively until the patient's discharge from the hospital on March 7, twelve days after the operation.

The soft tissues healed one week after the packing was removed. Postoperative roentgen control study on April 13 showed absence of the soft tissue caseation and clean saucerization of the bony defect (Fig. 8). At the time of writing, although the patient still has a slight limp, there is no other complaint referable to this condition. The microscopic diagnosis confirmed the clinical impression: tuberculous osteomyelitis of the greater trochanter and its bursa.

COMMENT

So far as we can determine, no rational approach to the management of trochanteric tuberculosis appears in the literature, although the fact that streptomycin is a helpful adjunct in treatment of tuberculosis is now well known.[17] When lesions are accessible such as those of the trachea and bronchi[18] the effect of this agent appears to be specific and completely curative after topical use supplemented by intramuscular injections. It is emphasized that for effective results the concentration of the drug in its initial dose must be adequate, otherwise streptomycin resistance will appear before expected results are obtained. This was observed in 6 of 12 cases reported by Madigan and his associates.[17c]

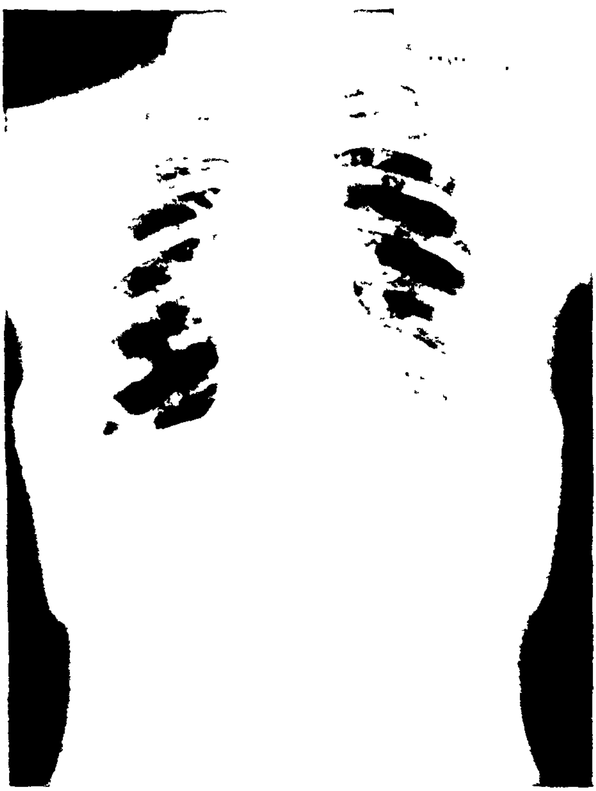

Fig. 7 (Case 2).—A pneumothorax is present on the right side.

Willis[19] has stressed the lack of knowledge concerning the effect of streptomycin in tuberculous lesions other than pulmonary and has urged diligent observations on other such foci.

Although some of the older reports stressed long-term immobilization in plaster, this does not now appear necessary, since the process in a sense does not involve a movable surface. Further, complete excision of the pathologic process can be done with little or no danger of a pathologic fracture, unless of course the disease has extended well into the neck of the femur. No apparent disability follows removal of the greater trochanter. These patients are known to have a limp before operation and it may continue unabated after operation. The number of bursas involved does not seem to be an important factor. Spalteholz describes sixteen bursas about the hip joint; other writers have described as many as thirty-one; only three appear to be of importance, namely: (1) the gluteus maximus bursa, over the greater trochanter; (2) the ileopectineal and (3) the ischiogluteal (Meyerding[12]).

Our routine of management, consisting of complete excision of all diseased tissue, thorough irrigation of the defect with warm saline solution, physiologic solution of sodium chloride, and the local implantation of streptomycin in order to insure a high concentration of the drug is similar to that of Steeken et al.,[20] who found that after intramuscular injections of streptomycin 1.8 to 2 Gm. daily, tuberculous cavities contained a higher concentration of the drug than did other tissues, and high enough to inhibit the growth of the organisms in vitro. We used intramuscular injections to support and buffer the local implantations.

Further support to this rationale is an observation by Jefferson [21] who followed this procedure in treating a tuberculous lesion of the distal portion of the ulna including the epiphysis There was roentgen evidence of complete arrest of the process, with restoration of function of the wrist joint after six months However because of the proximity of the joint a posterior molded plaster cast was worn during the six month period

SUMMARY

Two cases of tuberculous osteomyelitis of the greater trochanter and its bursas are presented together with a discussion of treatment and of early and intermediate postoperative results

An arbitrary routine procedure was followed by us as a result of our own observations and such observations and information as we could obtain from others in similar or comparable circumstances

In our 2 cases the right side was involved Both patients were adults one a man with a *history of trauma in early childhood* but no evidence of clinical tuberculosis elsewhere and the other a woman with an active pulmonary lesion

In our opinion total excision of the lesion thorough irrigation of the defect with warm saline solution and implantation of at least 2 Gm of streptomycin locally supplemented with 0.5 Gm of streptomycin intramuscularly every four hours in four doses daily for at least two weeks is a reasonable and rational approach to the treatment Immobilization by means of a plaster cast does not appear to be necessary

Except for some transient vertigo no untoward affects referable to the streptomycin therapy were observed by us

RÉSUMÉ

On presente deux cas d osteomyelite tuberculeuse du grand trochanter et de ses bourses, et on discute du traitement et des résultats post-opératoires immédiats et secondaires Selon les propres observations des auteurs et d'après les observations et les informations qu ils avaient pu obtenir d autres auteurs dans

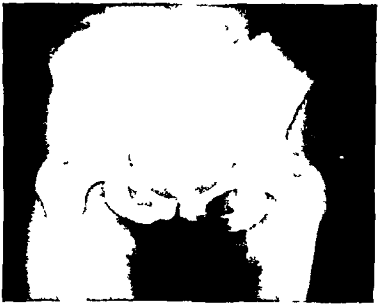

Fig 8 (Case 2) —Appearance of right greater trochanter approximately two months after saucerization

de semblables et comparables circonstances un procédé précis fut employé

Dans les deux cas présentés le côté droit etait atteint Les deux malades etaient adultes l un un homme presentant une histoire de traumatisme dès la première enfance mais nulle part une évidence de tuberculose clinique et l'autre une femme avec une lésion pulmonaire en activité

L excision totale de la lésion l irrigation complete de la lésion avec une solution salée chaude et la mise en place de au moins 2 gr de streptomycine localement à laquelle on ajoute 0.5 gr de streptomycine intramusculaire chaque quatre heures quatre fois par jour, durant au moins deux semaines tous cela d après l opinion des auteurs constitue un traitement s'approchant rationnellement d'une methode thérapeutique L immobilisation par un appareil plâtré ne semble pas necessaire A l'exception de quelques vertiges transitoires on n'observa aucun effet fâcheux causé par l emploi de la streptomycine

RESUMEN

Se estudian dos casos de osteomielitis tuberculosa del trocanter mayor y sus bolsas articulares analizandose su tratamiento y los resultados postoperatorios inmediatos y ulteriores

Se eligió un procedimiento operatorio como resultado de las observaciones de los autores

y de los datos e información que recopilaron de otros autores en casos similares o comparables.

En los dos casos presentados la localización era en el lado derecho. Ambos pacientes eran adultos y uno de ellos, del sexo masculino, presentaba una historia de traumatismo en su primeria infancia sin tener signos de tuberculosis en ningún otro lugar del organismo; siendo el otro paciente del sexo femenino, y teniendo otra lesión tuberculosa.

A juicio de los autores, la terapia más apropiada es la extirpación total de la lesión, la irrigación de la misma con solución salina caliente y la aplicación local de 2 gm. de estreptomicina como mínimo, complementada *por dosis de 0,5 gm. de estreptomicina por vía* intramuscular cada 4 horas, representando un total de cuatro dosis diarias por lo menos durante dos semanas. Al parecer no es necesaria la inmovilización mediante vendajes escayolados. A excepción hecha de una reacción transitoria de vértigo, no se han observado reacciones secundarias atribuibles a la estreptomicinoterapia.

RIASSUNTO

Descrive due casi di osteomielite tubercolare del grande trocantere e delle sue borse. Discute la cura e riporta i risultati a distanza. In ambedue i casi la lesione interessava il trocantere destro. Nel primo caso si trattava di un uomo adulto, senza altre lesioni tubercolari, nella cui anamnesi figurava un trauma nella prima infanzia. Nel secondo caso esistevano invece delle lesioni polmonari ancora attive. La cura e' consistita nell'escisione completa delle partiamalate; in un'irrigazione de difetto residuante con soluzione fisiologica calda; nell'impianto locale di 2 gr. di streptomicina, associato ad iniezioni di 0,5 gr. di streptomicina ogni quattro ore, per almeno due settimane. Non ritiene invece necessaria l'ingessatura dell'arto. L'unico piccolo inconveniente della streptomicina consiste in un transitorio senso di vertigine.

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An Observation in Cancer Research

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DOES the cause of cancer reside in the red blood corpuscles?

In the February 1948 issue of *Ex* *rimental Medicine and Surgery* appears an icle by Dr G Menowsky, "The Exper ntal Production of Epithelial Growth in the bbit Cornea" The author announces this nclusion "We believe the *blood* of patients ffering from advanced cancer contains either animate or inanimate stimulus which causes e epithelial cells of the cornea to grow in an controlled manner" As I hold a like opin , I wish to present the observations on which belief is based

Reference to laboratory notes shows *that in* 38 I first mentioned *queer looking bodies* en in or on the red blood corpuscles of the *e* blood of cancer patients These were seen rough the darkfield condenser of a high wered microscope, and at first little atten n was paid to them as they were then re rded as ordinary crenations of the red blood ls Because of recent improvements in the hting of darkfield it is now possible to dis rn these bodies far more clearly as the ac mpanying photomicrographs make plain

These photographs the work of the well own microphotographer Mr Julius Weber New York were taken with the new Zu narc lamp, containing a 100 watt bulb with initial *magnification of 1 350* They were er enlarged five times They were made from des prepared by making a smear from a eshly removed *unfixed* malignant human east cancer * Such a preparation is usually ade in the operating room a piece of can rous tissue *being taken from the inside of* e breast immediately after the breast's re val The slide is then fixed in methyl alcohol d stained for five minutes with a Giemsa ain to which a small quantity of eosin has en added to bring out the erythrocytes The de is then washed in distilled water and dried by blotting—not by heat By examination with Shillaber's immersion oil and highest power objective—we use 15X oculars—these bodies are clearly seen Their shadows may be discerned in the darkfield as shown by the two erythrocytes in Figure 1 and when the shutter of the darkfield condenser is shifted to admit the white light these bodies in or on the same two red blood corpuscles become even more distinct (Fig 2)

This observation has now been confirmed in studies of other breast cancers (Figs 3 4 5 and 6) and it is reported here in order that others may know of it The bodies have not yet been definitely classified

LA CAUSE DU CANCER RÉSIDE-T-ELLE DANS LES GLOBULES ROUGES?

Dans l'édition de février 1948 *de Medecine et Chirurgie Experimentale* a paru un article du Dr G Menowsky sur "La Production Expérimentale d'une Tumeur Epithéliale de la Cornée du Lapin" L'auteur fit la conclusion suivante "Nous croyons que le sang des malades atteints d'un cancer avancé, contient un principe actif, soit animé ou inanimé qui est la cause de la croissance des cellules épithéliales de la cornée d'une façon désordonnée" Comme je suis du même avis j'ai décidé de présenter les observations sur lesquelles est basée mon opinion

En se rapportant aux notes de laboratoire on voit qu'en 1938 j'ai le premier fait mention de *corpuscules d'aspect inusités* dans ou sur les globules rouges du sang vivant des malades cancéreux Ils furent aperçus a travers le condensateur du champ obscur d'un *microscope* a grande puissance et au début on fit trés peu attention à eux du fait qu'ils étaient alors considérés comme des irrégularités des globules rouges du sang A la faveur de récents progrès dans l'éclairage du champ obscur il est maintenant possible de distinguer des corpuscules beaucoup plus clairement comme le montrent les microphotographies ci jointes

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* Thanks are due to Dr Frank E Adair Breast Sur n Memorial Hospital New York City for furnishing terial to make this study

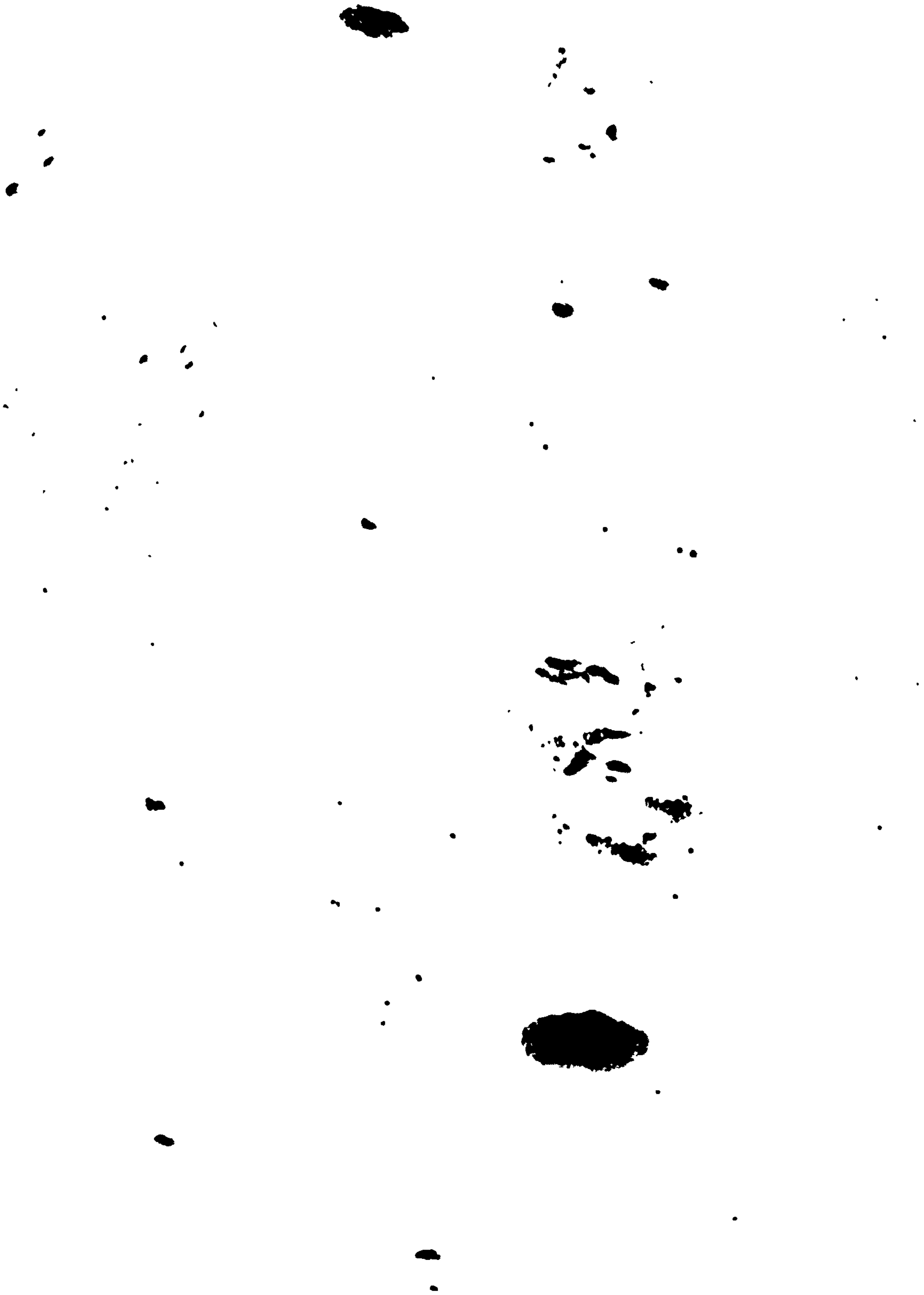


Fig. 1.—Darkfield photomicrograph showing two red corpuscles beside the large artifact. Made from a smear of a freshly removed *unfixed* malignant tumor (cancer) of the human breast. Giemsa stain.

Fig. 2.—Same two erythrocytes photographed with the white light of the Zirconia lamp.

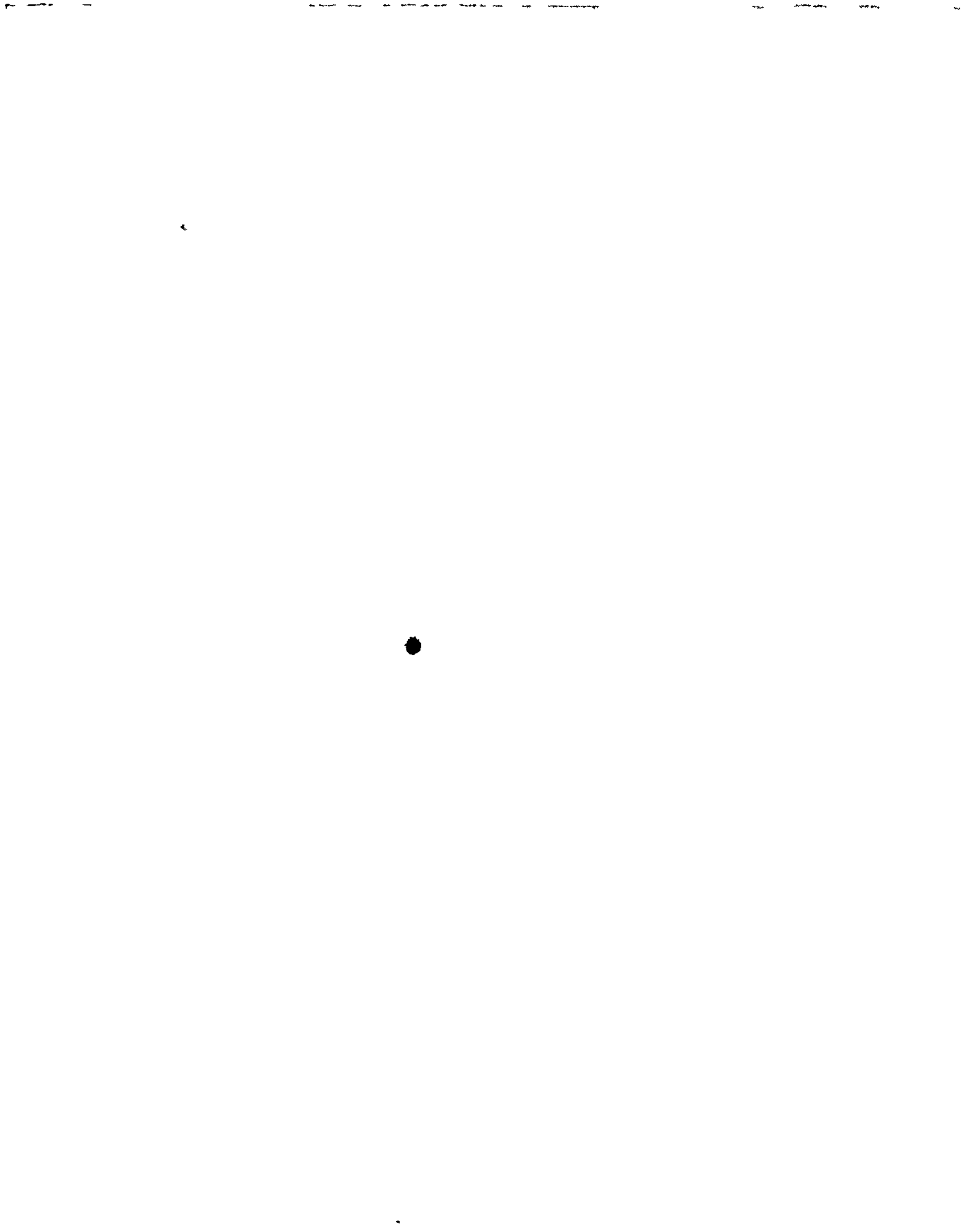


Fig. [illegible].—Single unexplained body in a red corpuscle. Note the halo around it. Note also that the operator has the body in perfect focus. (Taken in another case).

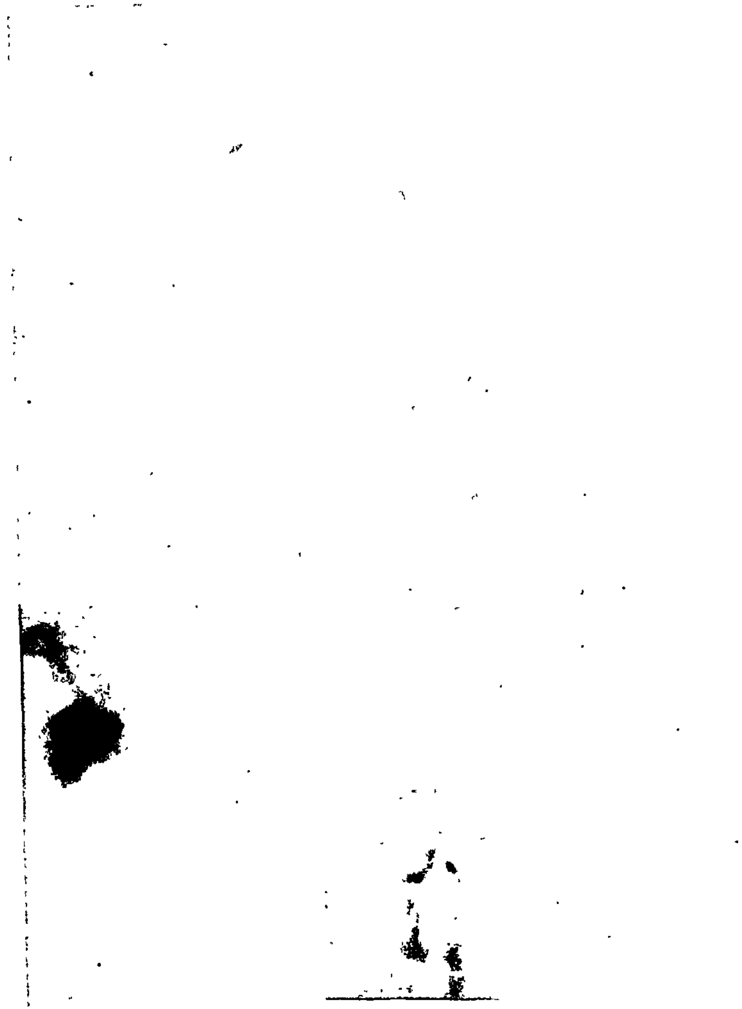
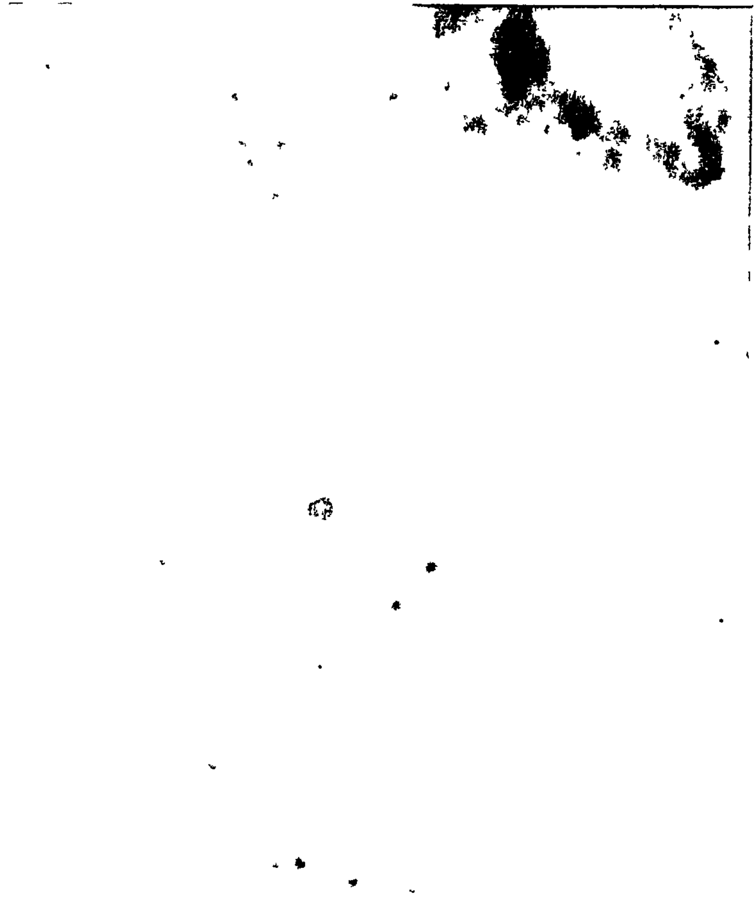


Fig. 4.—Five bodies clearly shown in another red blood cell.

Fig. 5 Many red blood cells, some showing bodies. (From another case.)



ig 6—Many bodies are visible in cases of advanced carcinoma Note the large nucleus of a cancer cell at lower right

Les photographies, travail d'un microphotographe bien connu, M. Julius Weber de New York, furent prises avec la nouvelle lampe Zirconard, contenant une ampoule de 100-watt avec un agrandissement initial de 1,350. Elles furent plus tard agrandies cinq fois. Elles furent faites avec des lames préparées en faisant un étalement d'un peu de sang humain, fraîchement prélevé de cancéreux atteint d'une tumeur maligne en évolution. Une telle préparation est actuellement faite dans la salle d'opération. La pièce du tissu cancéreux étant prise à l'intérieur du sein immédiatement après son ablation. La lame est alors fixée par l'alcool métylique et colorée pendant cinq minutes avec le colorant de Giemsa auquel une petite quantité d'éosine a été ajoutée pour faire apparaître les érythrocytes. Le lame est alors lavée dans d'eau distillée et sèchée au buvard, non à la chaleur. En examinant avec l'immersion dans d'huile de Sillaber et un objectif à très grande puissance—nous employons les oculaires 15X—ces corpuscules sont clairement aperçus. Leurs ombres peuvent être discernées dans le champ obscur, comme cela est montré par les deux érythrocytes dans la figure 1, et lorsque la fermeture du condensateur du champ obscur est déplacée pour permettre l'admission de la lumière blanche, ces corpuscules dans ou sur ces mêmes deux globules rouges deviennent plus distincts (fig. 2).

Cette observation a été confirmée par l'étude d'autres cancers du sein (fig. 3, 4, 5, & 6) et elle est rapportée ici pour que d'autres puissent la connaître. Ces corpuscules n'ont pas encore été définitivement classifiés.

¿RADICA EN LOS HEMATÍES LA CAUSA DEL CÁNCER?

En el número de Febrero de 1948 de la revista *Experimental Medicine and Surgery* se publicó un artículo del Dr. G. Meirowsky, titulado "The Experimental Production of Epithelial Growth in the Rabbit Cornea" ("La producción experimental de un tumor epitelial en la córnea del conejo"). El autor llegó a la siguiente conclusión: "Creemos que la sangre de los pacientes que sufren de un tipo avanzado de cáncer, contiene un estímulo animado o inanimado que es la causa de que las células epiteliales de la córnea se desarrollen de un modo incontenible." A este respecto, deseo presentar las observaciones personales por las que yo tengo la misma opinión.

Consultando ciertas notas de laboratorio se comprueba que en 1938 mencioné por vez primera unos cuerpos de apariencia extraña que se observaban dentro o sobre los hematíes de la sangre viva de los pacientes de cáncer. Estos cuerpos se observaban usando un condensador en campo oscuro de un microscopio de alta potencia, y en un comienzo se les prestó poca atención ya que se les consideraba como concreciones ordinarias de las células rojas de la sangre. Los recientes adelantos en la iluminación en campo oscuro han permitido observar estos cuerpos más ampliamente como lo demuestran las fotomicrografías acompañantes.

Las fotografías adjuntas que fueron tomadas por el conocido microfotógrafo Julius Weber de Nueva York se obtuvieron con la nueva lámpara Zirconarc que contiene una bombilla de 100 vatios y posee un aumento inicial de 1.350 diámetros. Las fotografías se ampliaron posteriormente a cinco veces su tamaño original. Fueron tomadas de láminas preparadas haciendo un frotis de un cáncer de mama maligno no fijado, humano. Dicha preparación se hace habitualmente en el quirófano, tomando un fragmento del tejido canceroso del interior de la mama, inmediatamente después de extirpar la misma. La preparación se fija con alcohol metílico y se tiñe durante cinco minutos con el colorante de Giemsa al que se le ha agregado una pequeña cantidad de eosina para hacer visibles los eritrocitos. Se lava entonces la lámina en agua destilada y se seca, no por el calor, sino con un secante. Al examinarla usando el método de Sillaber de inmersión en aceite y un objetivo de la más alta potencia -nosotros empleamos oculares x 15 - se observan claramente estos cuerpos. Las sombras de los mismos pueden observarse en el campo oscuro como se observa en los dos eritrocitos de la figura 1. Cuando el diafragma del condensador en campo oscuro se mueve para dar entrada a la luz blanca se aprecian más distintamente estos cuerpos situados dentro o sobre los mismos dos hematíes (figura 2).

Estas observaciones se han confirmado por los estudios realizados en otros cánceres de

mama (figuras 3, 4, 5 y 6) presentandose en esta comunicación para que la conozcan otros investigadores Los cuerpos citados no se han clasificado todavía de un modo definido

RISIEDE LA CAUSA DEL CANCRO NEI GLOBULI ROSSI DEL SANGUE?

Nel numero di febbraio 1948 dell *Experimental Medicine and Surgery* e' apparso un articolo del Dr G Menowsky del titolo "Produzione sperimentale di proliferazioni epiteliali nella cornea del coniglio Menowsky giunge alle seguenti conclusioni 'Riteniamo che nelle fasi avanzate del cancro il *sangue* dei pazienti contenga uno stimolo animato o inanimato capace di determinare una proliferazione illimitara delle cellule epiteliali dello cornea" Quest'opiniane e' esatta ed ora dimostrero' il perche di questa mia convinzione

In note di laboratorio datanti dal 1938, io vidi nell'interno o al disopra dei globuli rossi del sangue fresco di pazienti affetti da cancro dei strani corpuscoli Questi erano visibili nel campo oscuro di un potente microscopio In quell'epoca attribuii scarsa importanza a questi corpuscoli essi erano allora considerati quali comuni incrinature dei globuli rossi In base a recenti progressi nell'illuminazione del campo oscuro, questi corpuscoli possono essere ora visti molto piu' chiaramente come risulta dalle seguenti microfotografie Queste fotografie, opera del noto fotografo Julius Weber di New York, sono state eseguite con la nuova lampada Zirconare con un bulbo 100 Watt con un ingrandimento iniziale di 1350 Sono state successivamente ingrandite 5 volte I preparati sono stati ottenuti da strisci di carcinoma della mammella appena asportato e non fissato Questo procedimento viene per lo piu' seguito nella stessa sala operatoria Gli strisci vengono fissati in alcool metilico e colorati per 5' con Giemsa, al quale viene aggiunta una una piscola quantita' di eosina onde porre meglio in rilievo gli eritrociti Gli strisci vengono porlavati con acqua distillata ed asciugati con carta assorbente, non con calore

Con un potente microscopio ad immersions (oculare x 15) questi corpuscoli possono essere visti bene e facilmente Le loro ombre sono chiaramente identificabili nel campo oscuro (nella fig 1 sono contenuti in due eritrociti) allorquando il diaframma del condensatore viene spostato in modo da amettere nel campo amche la luce bianca, il loro aspetto diventa ancora piu' distinto (fig 2) Osservazioni analoghe sono state eseguite in altri carcinomi della mammella (fig 3-4 5 6)

I corpuscoli non sono stati finora definitivamente classificati Abbiamo creduto opportuno di ritornare sull'argomento onde informare altri ricercatori di queste osservazioni

Retroperitoneal Lymphosarcoma Complicating Pregnancy

Report of a Case

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AN INTERESTING case of retroperitoneal lymphosarcoma complicating pregnancy has recently been observed. The special interest lies in the fact that the patient carried her pregnancy to term and was delivered spontaneously even though the malignant tumor involved had progressed to the extent of metastases and to a weight of 8 pounds (3.629 Gm.). A brief review of the literature concerning lymphosarcoma will be presented, with special reference to lymphosarcoma of the retroperitoneal type.

HISTORICAL NOTES

Lymphosarcoma was formerly included in the concept of pseudoleukemia. It was only through the work of Kundrat and Paltauf that it finally received recognition as an entity. It was Kundrat[1] who first recognized a notable gross and microscopic distinction between this process and the other aleukemic lymphomas. It is probable that Billroth had noted some difference, for he classified such tumors as "malignant lymphomas," describing them as locally destructive and recurring tumors of lymph nodes, but he could not separate the different types of these processes.[2]

Kundrat finally described lymphosarcoma as a tumor arising only from groups of lymph nodes, not from single nodes, and from adenoid tissue of mucous membrane, from which point he described it as extending to the neighboring nodes and the surrounding tissue. He noted that the systemic character of leukemia and pseudoleukemia was missing, and that the spleen, bone marrow and liver were rarely involved. His first classification of this tumor was that of "lymphosarcomatosis," and it is from his original study that today we know this tumor as lymphosarcoma.[3]

DEFINITION

Lymphosarcoma is a malignant tumor arising in lymphatic tissue, usually from a group of nodes or from a localized tract of mucosal lymphoid tissue, or occasionally from a single lymph node.[4]

PATHOLOGIC PICTURE

Morbid anatomy: The enlarged lymph nodes are at first isolated, but soon they become matted together, and the malignant cells invade the capsule with resultant destruction. Kundrat recognized the regional character of the growth. Ewing[5] defined lymphosarcoma as a "true malignant neoplasm arising in the lymphatic tissue from a proliferation of atypical lymphocytes." It occurs as (*1*) a localized or (*2*) a diffuse process. The former is more malignant than the latter, but its rapid course as well as the occurrence of intermediate types, indicates that there is no other important distinction between them. It is distinguished from the other types of lymphoma by its local destructive capacity and by the formation of true metastases in distant regions.

Microscopic Appearance: This type of tumor is expansive, infiltrating and invasive. It spreads through the regional lymphatics and, by rapid proliferation, in loose connective tissue. Distant metastases may occur in bones, lungs, heart or kidney. Microscopically the growth is composed of masses of lymphoid cells in the meshes of a fine reticulum. The cells exhibit the usual characteristics of malignancy, quickly destroying the normal capsules of the lymph glands and invading the adjacent tissues. The mature lymphocytes are crowded out by the larger hyperchromatic cells, which contain a small amount of basophilic cytoplasm together with a round or oval nucleus and a prominent nucleolus. Mitoses may be present but often are not easy to recognize. The uniformity of cell type is an outstanding feature

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this disease There is no increase in reticu- m as shown by silver stain Those fibers nich are present represent the original con nt of the node, and these are greatly dis ised by the infiltration of neoplastic cells that they may appear decreased in number on microscopic examination Structurally is tumor, as described by Kundrat is com sed of lymphoid cells of variable size lying a reticular tissue All in all, the structure of mphosarcoma is rather specific, as it pre nts a diffuse growth of lymphoid cells lying reticular tissue The cells vary in size, some ing large and some small The nuclei are mpact or vesicular and are always hyper romatic

SYMPTOMS

Lymphosarcoma is rarely diagnosed prior to eration, and it is most frequently recognized n the autopsy table[6] No constant or consis nt group of symptoms has occurred in any the cases reported

The first attack may simulate acute abdom ial infection and is frequently diagnosed as ute appendicitis or as a generalized consti itional symptom of anemia cachexia or eakness Any pain associated with this dis ise is usually colicky, with little tendency to calize In the intestinal variety blood may observed in the stool, and massive intestinal emorrhage has occurred in some cases Intus isception also has occurred Perforation of ie bowel has been known to occur Obstruc on is present in from 50 to 60 per cent of the itestinal cases Age does not seem to have any earing on the matter, the patients range from to 70 The average age is about 40 Male atients show a slightly higher frequency of ivolvement than do female patients, the ratio eing about 5 to 2 Irregular fever and pro ressive cachexia are common to all forms of ie disease Pain from involvement of the re ional nerves occurs eventually in some cases Vhen the tumor is located in the retroperito eal and mediastinal regions the pain is espe ially distressing With regard to the intestinal pe of neoplasm, a recent review of Carson's eveals that 20 per cent of the lesions were pri iary in the ileum Symptoms vary as to the lo ation of the tumor For this reason Boyd,[8] for descriptive purposes divided lymphosarcomas into a number of groups depending on the principal or primary site of tumor formation (*1*) cervical, (*2*) axillary (*3*) inguinal (*4*) pharyngeal, (*5*) mediastinal and (*6*) abdominal The great variety of symptoms that may occur as a result of lymphosarcoma in each or all of these various locations cannot be included in this review, which is limited chiefly to lymphosarcoma of the abdominal type, with special reference to the retroperitoneal

DIAGNOSIS

The diagnosis depends upon the symptoms already discussed, and usually upon the presence of a mass From Carson's recent discussion of retroperitoneal tumors it is apparent that the differential diagnosis of retroperitoneal lymphosarcoma is difficult Carson[9] classified retroperitoneal tumors as follows (1) lipoma liposarcoma, (2) myxoma, myosarcoma, (3) teratoma, (4) lymphoma

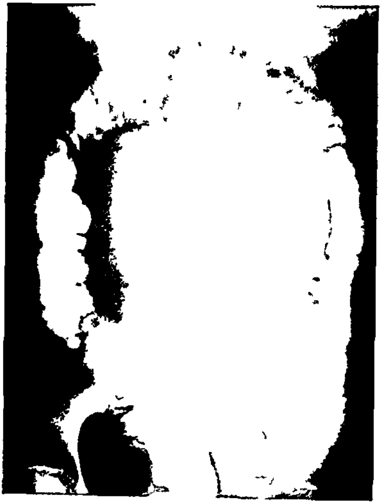

Fig 1—Roentgenogram showing large mass almost completely filling abdomen

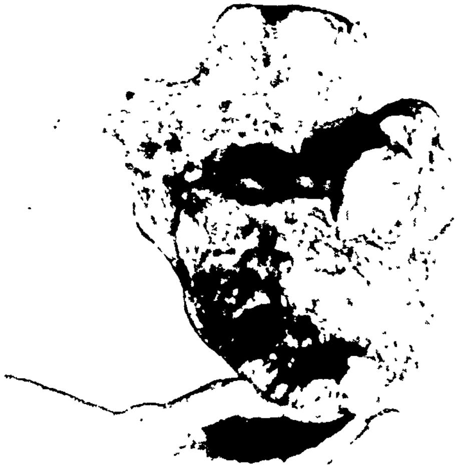

Fig. 2.—Retroperitoneal mass after removal.

lymphosarcoma (Hodgkin's); (5) ovarian cystoma; (6) adenocystoma; (7) chorioepithelioma; (8) neuroblastoma; (9) leiomyoma, leiomyosarcoma; (10) fibroma, fibrosarcoma, and (11) adenoma, adenocarcinoma.

As has been mentioned, it is with the abdominal group that this paper proposes to deal. Once the diagnosis is made, two varieties of lymphosarcoma must be distinguished. In the first the disease appears to be in the retroperitoneal or the mesenteric lympth nodes, while in the second the starting point seems to be in the intestinal lymph tissue. This is true particularly in the lower part of the ileum. Lymphosarcoma is distinguished from other forms of lymphoma by its local destructive capacity and by the formation of true metastases in different organs. Fever is often a prominent symptom, but anemia and cachexia may not appear until toward the end of the disease. In comparing patients with lymphosarcoma with those suffering from Hodgkin's disease it may often be noted that the former do not appear seriously ill until shortly before death, while the typical patient with Hodgkin's disease is feeble, emaciated and cachectic for a long time prior to death. Clinically the disease is progressively fatal. Its symptoms are more local than general and are largely due to pressure produced by the large lympoid masses that result

Lymphoid tissue in any part of the body may be involved, so that not only the lymph nodes but other structures, such as the spleen, the liver and especially the gastrointestinal tract, may be sites of tumor formation. The characteristics that distinguish lymphosarcoma from other conditions that resemble it in a confusing way are best recorded in a comparative form. From a study of the cells in a single section it would probably be impossible to distinguish between chronic lymphoid leukemia, lymphosarcoma, and small round cell sarcoma. In chronic leukemia the glands become enlarged but remain discrete. There is dissemination of lymphoid cells in the capillaries of organs otherwise practically unchanged, and there is the leukemic state of the blood. In lymphosarcoma there is an invasive or infiltrating lymphoid growth that has a peculiar regional way of spreading and tends to be limited either to the thorax or to the abdomen. There is no leukemic change of the blood picture. Round cell sarcoma offers much less difficulty. It starts anywhere in the connective tissue as a single tumor nodule that invades the surrounding tissues and metastasizes by way of the blood stream, forming new discrete nodules in such distant organs as the lungs, liver, etc. When lodged in the lymph gland it produces a solid nodule with an outline, outside which some remnant of the gland may be found unchanged. All others cause a complete replacement of the gland, although occasionally a localized lymphosarcomatous infiltration may leave the rest of the gland intact.[10]

TREATMENT AND PROGNOSIS

The treatment of lymphosarcoma is chiefly irradiation. This tumor is highly radiosensitive, and marked regression in size of a lymphosarcoma is usually evident after the use of roentgen therapy.

However, the outcome is usually that of a progressive fatality, and, although irradiation is of value, the overall picture is not good.

REPORT OF CASE

Mrs. A. M., aged 23, was admitted to the hospital on Sept. 27, 1948. Her chief complaint was that she had noticed a large mass on the left side of the adbomen for the past six months. She had had the usual childhood diseases without sequelae, and there was no history of any serious previous illnesses, accidents, injuries or surgical operations. Menstruation had begun at the age of 12, and except during a recent pregnancy there had been no alteration in the menstrual cycle.

The patient had been married for two years. Her husband's health was good. There was no clinical, familial or marital history of tuberculosis, cancer or venereal disease. The patient had always been healthy and had led a normal and uneventful life up until the time of her present illness. Six months prior to admission, while she was still pregnant, she noticed a mass in the left upper abdominal quadrant. She consulted her physician about this, but as far as can be determined nothing was done. The patient continued through her pregnancy, and three weeks prior to her admission to the hospital had delivered at home a normal living male infant. Delivery had been spontaneous, and there had been no apparent complications. She had noticed throughout her pregnancy that instead of gaining weight she was losing it, and after her pregnancy she found that she weighed 21 pounds (9.5 Kg.) less than she had weighed before she became pregnant. The mass had become progressively larger during pregnancy, but her physician had told her that this "was to be expected." She noticed that she had become very pale and that her appetite was failing rapidly.

After delivery the mass did not disappear, but became larger and harder. It did not trouble the patient beyond her constant awareness of its presence. She stated that it worried her a great deal. Evacuation was apparently normal, and the patient complained of no symptoms referable to the urinary tract. She had had some mild backache but had ascribed it to pregnancy, and when it continued she was not alarmed about it. Gradually, however, owing to the increasing size of the mass it became difficult for her to sit down or lie down with any degree of comfort. She was most comfortable when standing.

Physical examination revealed a temperature of 100 F., a respiration rate of 22, a pulse rate of 90 and a blood pressure of 100 systolic and 60 diastolic. The patient was pale and emaciated. The skin was scaly. There were no petechiae or cutaneous rashes. The head was of normal contour, but the skin over the head was shrunken and the eyes were sunken. There was no evidence of osseous disease or exostosis of the skull. The pupils were dilated but equal; they reacted to light and accommodation. Examination of the fundi revealed nothing of significance. The neck was thin, and in the left supraclavicular region was a small hard node. The breasts were small and atrophied, but no masses were present. The heartbeat, although rapid, was regular, and there was no evidence of murmur, arrythmia or enlargement. Examination of both lung fields revealed them clear to percussion and auscultation. The abdomen was enlarged to about the size of a full term pregnancy. The distended area was hard. It was limited chiefly to the upper and lower left abdominal quadrants. The mass itself was well defined and not easily movable. It was not tender but had a definite nodular feeling.

The liver was slightly enlarged to below the right costal border, and the spleen was not palpable. There was some evidence of shifting dullness, suggesting the probability of ascites. Examination of the genitourinary tract revealed no evidence of tenderness in the renal area, and as far as could be determined the remainder of the genitourinary tract was within normal limits. The skeletal system showed no evidence of limitation of motion, osseous disease or exostosis.

Neurologic examination revealed the reflexes to be equal and active and other Babinski reflexes to be negative. Examination of the lymphatic system at the time of admission showed no evidence of lymphadenopathy except in the left supraclavicular region. Vaginal examination revealed the uterus to be small and pushed to the right; the tumor mass was just palpable above and a little to the left of the uterus. As far as the adnexae were concerned no masses were felt. The mass was hard to vaginal palpation and seemed movable. There was no evidence of vaginal discharge. Rectal examination revealed the lower part of the rectum, as far as the examining finger could determine, to be free of any masses, but at the tip of the examining finger the aforedescribed mass could be palpated lying on the left side. The muscular system revealed some evidence of muscular atrophy, especially in the limbs.

Laboratory tests on admission revealed the urine to be acid, with 1 plus albumin and no sugar. Rare hyaline casts were present. A few pus cells and a few epithelial cells were observed in the catheterized specimen. Examination of the blood revealed a negative Wassermann reaction. The blood was type A and Rh positive. The value for hemoglobin was 74 per cent. The leukocyte count was 11,650 per cubic millimeter of blood, with 86 per cent polymorphonuclears, 13 per cent small lymphocytes and 1 per cent monocytes. The stools gave negative results for occult blood, ova or parasites.

Roentgen examination (Fig. 1) revealed a large mass almost completely filling the abdomen. This mass was circular, and the transverse colon appeared to follow around it.

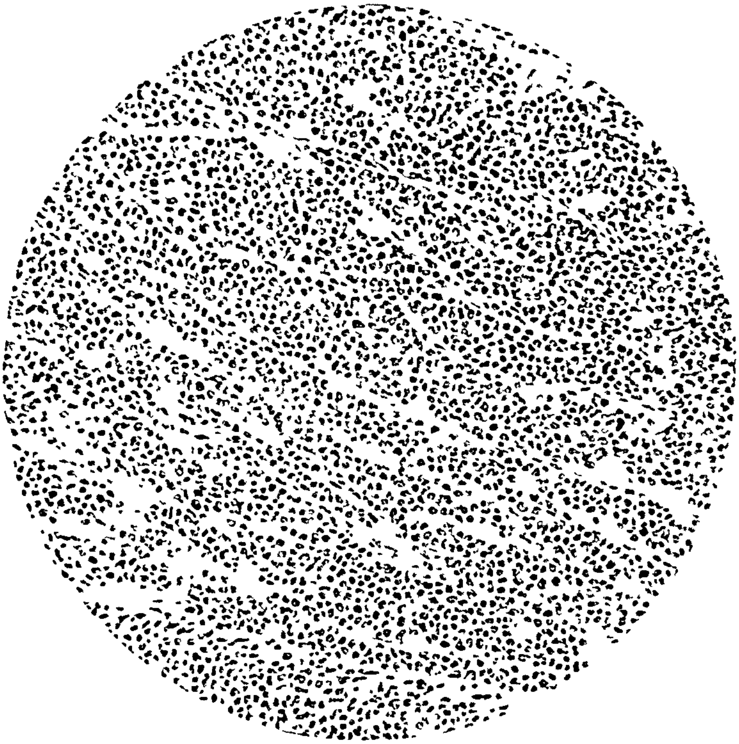

Fig. 3.—Photomicrograph of pathologic section of tumor, × 150.

After admission to the hospital the patient was given 1 pint (473 ml.) of blood, and the hemoglobin value rose to 82 per cent. The erythrocyte count rose from 3,720,000 to 3,930,000 per cubic millimeter of blood. There was no appreciable change in the leukocyte count. Two days after admission an exploratory operation was performed with the patient under closed ether anesthesia. A left rectus-splitting incision was made. The uterus and adnexae revealed nothing remarkable. However, lying just above the pelvic brim in the left lumbar gutter a large retroperitoneal mass was observed. The peritoneum immediately over this mass was thickened and injected. The thickening of the peritoneum extended from the posterior wall up to the anterior wall itself. For this reason it was almost impossible to strip the peritoneum free and approach the mass by a retroperitoneal route. An incision was made, therefore, through the posterior peritoneum, and the mass was dissected out from its bed. It was found to be closely adherent to the lower pole of the left kidney. Blunt dissection proved easy, and only mild venous oozing was encountered.

After removal of the mass, the peritoneum was closed over its bed and the remainder of the abdomen was explored. Exploration revealed no evidence of hepatic involvement and no metastases to any other of the abdominal organs. The abdomen was then closed, and the patient was returned to her room in good condition. Her postoperative course was rather stormy, but after four days her condition quieted. She was discharged from the hospital on the twelfth postoperative day.

Pathologically the growth was first diagnosed as malignant neuroblastoma, but further study resulted in a diagnosis of lymphosarcoma. The specimen (Fig. 2) was a mass 20 cm. in length and 50 cm. in its other diameter. It weighed 8 pounds (3,629 Gm.). It had a thick capsule. The surface was glistening but somewhat nodular. When sectioned, the entire structure was seen to consist of friable cream-colored tissue. Throughout this tissue were various-sized areas of hemorrhagic material. The cellular structure upon final microscopic study was that of lymphosarcoma.

After her discharge from the hospital the patient was referred for roentgen therapy, with resultant recession in the size of the mass itself, but there was no general improvement. The patient lost about 25 pounds (11.3 Kg.) more in weight and began to show evidence of metastases in the rectum

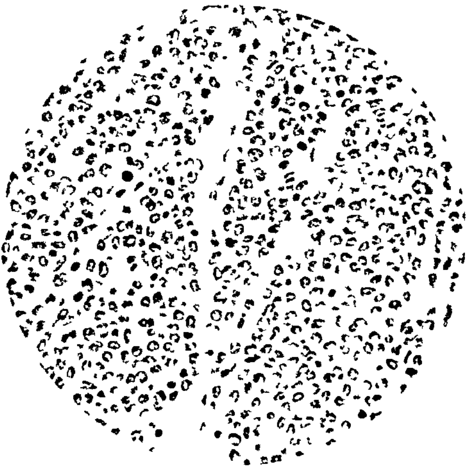

Fig 4—Photomicrograph of tumor mass × 550

and the liver Ascites finally developed and about 5 gallons (19 9 L) of ascitic fluid was removed from the abdomen on an average of about once a week Her course continued down hill and she died six months after the original operation

At autopsy the entire abdominal cavity was observed to be riddled with metastases from the original tumor These involved the peritoneum the liver the stomach the omentum and the gastrointestinal tract The entire gastrointestinal tract was matted together with cream colored friable metastatic growths The liver revealed numerous patches of ivory colored homogeneous tissue rather rubbery On section these showed small areas of orange colored tissue scattered in small irregular foci throughout the tumor masses Microscopic sections of the tumor (Figs 3 and 4) showed closely packed round cells with large nuclei and but little cytoplasm

Many of the nuclei exhibited nucleoli Mitoses were moderately numerous Fine strands of fibrous tissue coursed through the tumor and in a few places fibrosis was relatively prominent The neoplastic cells showed no definite arrangement Sections of the various specimens were invaded by a similar neoplasm The histologic picture was that of a malignant lymphoma predominantly lymphoblastic (lymphosarcoma) According to the pathologic report evidently began in the retroperitoneal lymph node

SUMMARY

1 A case of retroperitoneal lymphosarcoma complicating pregnancy is reported

2 A brief discussion of lymphosarcoma with regard to morbid anatomy microscopic appearance diagnosis and symptoms is given

3 A review of the literature with special attention to lymphosarcoma of the retroperitoneal variety is presented

RESUME

1 On rapporte un cas de lymphosarcome retroperitoneal compliquant la gestation

2 On fait une breve discussion du lymphosarcome sur l anatomie pathologique d apparence microscopique On fait un expose du diagnostic et des symptomes

3 On fait une revue des articles parus en accordant un interet particulier au lymphosarcome de la variete retroperitoneale

RESUMEN

1. Se describe un caso de linfosarcoma complicando el embarazo.
2. Se estudia la anatomía patológica, aspecto microscópico, diagnóstico y síntomas del linfosarcoma.
3. Se pasa revista a la literatura médica, prestando una atención especial al linfosarcoma de tipo retroperitoneal

RIASSUNTO

1) Descrive un caso di linfosarcoma restroperitoneale complicante la gravidanza.
2) Discute brevemente l'anatomia patologica e la diagnosi dei linfosarcomi.
3) Passa in rassegna la letteratura sull 'argomento, con particolare riguardo alla varieta' retroperitoneale.

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The International College of Surgeons

announces extension of the deadline for the

Hippocrates Essay Contest
to May 1, 1950

In appreciation of the fine response to date, the Contest Committee has voted to prolong the period during which submissions will be received. The title of the essay is "The Meaning of Hippocrates in the Medical World of Today": the award, a $100 Government bond. There is no restriction as to eligibility or as to the length of the essay. Dr. Skevos Zervos, noted Greek physician and authority on the life of Hippocrates, heads the judges' committee. All manuscripts should be addressed to

Hippocrates Essay Contest
1516 Lake Shore Drive, Chicago 10

and must be postmarked not later than May 1, 1950.
The winning essay will be published in the *Journal.*

Incidence of Hepatic Dysfunction in Chronic Calculous Cholecystitis

HENRY G. BREGENSER, M.D., F.A.C.S., F.I.C.S., AND
PAUL GROSS, M.D., F.A.C.P., F.C.A.P.
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IT has been of some concern to us and to many of our associates that a certain number of cholecystectomized patients return with complaints similar to those existent prior to the operation. Failure of cholecystectomy to relieve patients of their complaints is so much more frequent in cases of noncalculous than in calculous cholecystitis that many surgeons are reluctant to remove a gallbladder affected with the former.

In our opinion the primary reason for failure of cholecystectomy to relieve all patients lies in an associated dysfunction of the liver. This is not a new idea; Dr. E. A. Graham[1] observed hepatic disease associated with chronic cholecystitis more than thirty years ago. However, because disease or dysfunction of the liver has proved difficult to detect early, many surgeons feel that liver function tests are of little value.

The more recently introduced flocculation tests, namely, tests for cephalin cholesterol flocculation and thymol turbidity, have proved more sensitive than any previously used for detecting early hepatic dysfunction. With emphasis placed upon these more sensitive tests we reviewed 129 cases of chronic cholecystitis with stones. In all of these cases the patients were operated upon and the diagnosis confirmed by gross and microscopic pathologic examination. The determination of hepatic dysfunction was based upon abnormal values indicated by the flocculation test and other commonly used tests, as follows:

Test	*Pathologic Level*
Thymol turbidity	more than 4 units
Cephalin cholesterol flocculation	2 plus or more in 48 hours
Serum albumin	Below 4 Gm. per 100 ml.
Serum albumin globulin ratio	Below 1.5
Serum bilirubin	Over 0.5 mg. per 100 ml.
Serum alkaline phosphatase	Over 15 King-Armstrong units

Preoperative disturbance of hepatic function was observed in 28 per cent of 129 patients subjected to cholecystectomy (36 patients).

The distribution of the 36 cases with respect to the type of test used is given in Table 1.

Abnormal values for thymol turbidity were noted in 25 cases. The distribution of these values is illustrated in Fig. 1. In 10 cases there were values between 4.3 and 5.4 units and in 4 between 7.1 and 9.5 units. In the remaining 11 the values ranged between 10.3 and 25 units.

Of the 36 cases in which there were abnormal test values the cephalin cholesterol flocculation test was performed in 24. As may be noted

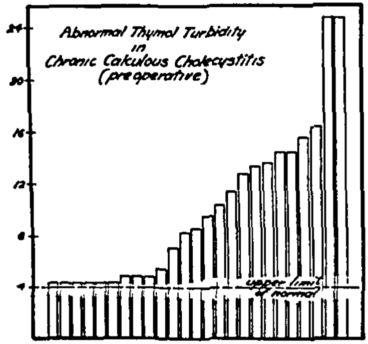

Fig. 1. Graphic representation of abnormal thymol turbidity levels in 25 patients with chronic calculous cholecystitis.

[illegible] Lab[illegible]
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Stat[illegible]

TABLE 1.—*Hepatic Dysfunction in 129 Cholecystectomized Patients*

Total incidence of abnormal tests	36 (28%)
Abnormal flocculation* only	23
Abnormal thymol turbidity only	10
Abnormal flocculation plus other tests	3
Abnormalities in other than flocculation tests**	10

*Thymol turbidity and/or cephalin flocculation tests
**Exclusive of serum bilirubin.

TABLE 2.—*Cephalin Flocculation in Chronic Cholecystitis*

	Degree of flocculation	*Number of patients*
Normal	0	5
	+ −	1
	+ = −	5
Pathologic	2 + = −	7
	3 + = −	3
	4 + = −	3

from Table 2, abnormal values were discovered in more than one-half of this group.

Only 10 patients showed serum bilirubin values of over 2 mg. per hundred milliliters (level of clinical icterus). In some of these cases needle biopsy specimens of the liver were obtained by means of a Vim-Silverman needle. All of the specimens showed focal hydropic degeneration of the hepatic cells. The latter were so swollen that the sinusoids were all but obliterated. The type of degeneration was similar to that recently described by Popper, Steigmann and Szanto[3] and classified as Grade III (Fig. 2). In 2 cases there was indisputable evidence of inflammation characterized by exudation of monocytes, lymphocytes and polymorphonuclear leukocytes about small bile ducts (Fig. 3). In these cases the thymol turbidity value was 5.4 and 7.1 units and the cephalin flocculation value 2 and 3 plus, respectively. The thymol turbidity values in other cases ranged from 8.5 to 15.6 units and the cephalin-cholesterol flocculation values from 0 to 2 plus. The liver biopsy specimen in each case was taken from the anterior aspect of the right lobe approximately 10 cm from the inferior edge.

It has been possible to reexamine 27 patients at varying intervals after cholecystectomy. N[illegible] [illegible] [illegible] levels on preoperative tests of liver function. In the other 8 the preoperative status of liver function is not known. The results are listed in Table 3.

TABLE 3.—*Postoperative Evaluation of Cholecystectomized Patients*

	Interval since operation	*Thymol turbidity*	*Cephalin flocculation*
Patients clinically improved, with normal test levels, 7 (26%)	8 mo.	3.7	+ −
	1 yr.	2.0	+ −
	1½ yrs.	3.7	0
	2 yrs.	2.5	+ −
	3 yrs.	2.6	1 + = −
	3 yrs.	2.8	+ −
	3 yrs.	2.5	+ −
Patients clinically improved, with abnormal test levels, 14 (52%)	1 mo	2.8	3 + = −
	2 mo.	14.4	1 + = −
	2 mo.	3.7	4 + = −
	2 mo.	4.8	0
	2 mo.	5.4	2 + = −
	3 mo.	6.0	0
	6 mo.	4.3	+ −
	15 mo.	4.3	0
	1 yr.	11.3	0
	1 yr.	4.3	0
	1 yr.	13.2	2 + = −
	1 yr.	4.3	0
	3 yrs.	4.3	3 + = −
	4 yrs.	8.2	1 + = −
Patients clinically unimproved, 6 (22%)	3 mo.	6	0
	5 mo.	14.4	3 + = −
	18 mo.	14	4 + = −
	2 yrs	25	4 + = −
	2½ yrs.	12.7	4 + = −
	4 yrs.	4.3	4 + = −

COMMENT

Emphasis has been placed throughout this presentation upon the flocculation tests as a measure of hepatic dysfunction. Both the cephalin-cholesterol flocculation test and the thymol turbidity test involve reactions with serum globulins. The former is dependent upon the gamma globulins; the latter, upon lipid-globulin combinations. The production of globulins is considered to be the function of reticuloendothelial cells, which are abundant in the liver.

Both flocculation tests have been proved to offer satisfactory sensitivity and are of great practical worth in the evaluation of various types of organic disease of the liver. There is reason to believe, however, that these tests may yield pathologic values in conditions other

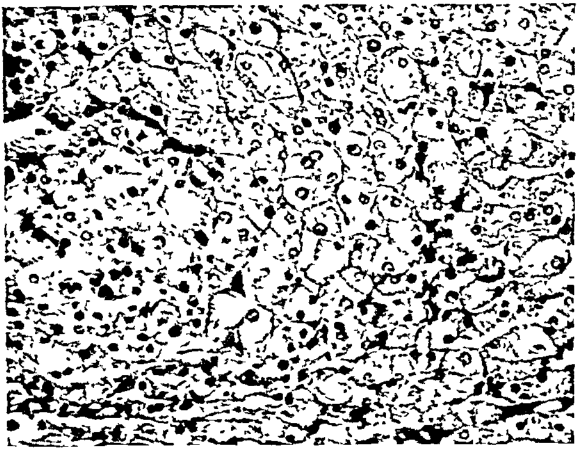

Fig 2 Photomicrograph of liver biopsy specimen, showing severe hydropic degeneration The sinusoids are practically obliterated The liver cells are swollen, the cell boundaries ruptured The nuclei vary in size Some are pyknotic, others show karyolysis In a few cells the nuclei are absent

than primary disease of the liver Chronic ulcerative colitis and infectious mononucleosis are examples of diseases in which abnormal flocculation values may appear In consideration of the fact that hepatic lesions have been observed microscopically in cases of infectious mononucleosis and that hepatic fatty change is not uncommon with chronic ulcerative colitis and other nutritional disorders the occurrence of abnormal flocculation values in association with these diseases may justifiably be interpreted as reflecting secondary liver involvement or dysfunction

A similar concept applies to our cases of gallbladder disease It is our opinion that the pathologic levels noted in the various tests applied to our patients reflect hepatic dysfunction Support for this theory is gained from the pathologic reports which indicate demonstrable lesions in biopsy specimens removed from the liver at the time of cholecystectomy Degenerative changes were demonstrable in all our liver biopsies

Hepatic involvement in disease of the gallbladder is usually considered secondary to the latter and is envisioned by the surgeon as ascending choleangiolitis Direct proof for the occurrence of choleangiolitis is afforded by some of the liver biopsies Indirect presumptive evidence is furnished by patients without biliary obstruction who improve promptly after cholecystectomy and in whom the pathologic levels revealed by hepatic function tests likewise improve

Pathologic values on flocculation tests or other tests (observed in 28 per cent of our series) together with the continuance of symptoms years after cholecystectomy (as in 22 per cent of our follow up group) suggest that the symptoms of the unimproved patients stem from the liver It appears probable that the generally unsatisfactory surgical results obtained in cases of so called noncalculous cholecystitis may have a similar background Most if not all of the symptoms in such cases may also be present in cases of hepatitis

It should be pointed out that the 28 per cent incidence of hepatic dysfunction among our 129 cholecystectomized patients does not represent the true incidence Many patients

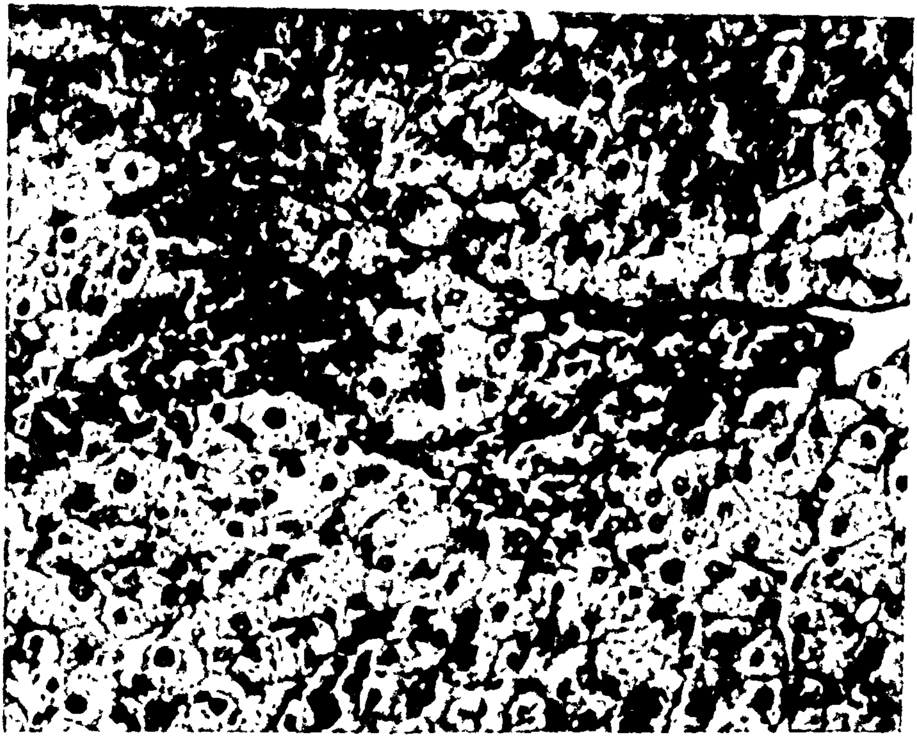

Fig. 3. Photomicrograph of liver biopsy specimen, showing inflammatory exudate in addition to hydropic degeneration. The inflammatory exudate is situated about the bile ducts and consists of lymphocytes, monocytes and scattered polymorphonuclear leukocytes.

had only one or two or, at the most, five tests recorded. The more sensitive flocculation tests were not done on all the patients. Our 28 per cent incidence is therefore a minimal figure, and the true incidence is probably higher. However, there is need for some caution, since Popper and Steigmann[28] have recently called attention to the occasional occurrence of "biologically false positive" results from the thymol turbidity test and the cephalin-cholesterol flocculation test.

Determination of the true incidence of hepatic dysfunction in cases of chronic disease of the gallbladder requires further study of a much larger series of cases than is here presented. Such a study should include the more sensitive flocculation tests.

SUMMARY

1. A study was made of liver function tests in a series of 129 cholecystectomized patients. These patients had chronic cholecystitis with stones. Emphasis was placed on the sensitive thymal turbidity test and the cephalin-cholesterol flocculation tests, both of which are more sensitive than tests formerly applied.

2. Evidence of hepatic dysfunction was found in 28 per cent of the patients in this series.

3. Follow-up studies of 27 patients showed clinical improvement in 78 per cent and no clinical improvement in 22 per cent. The results of liver function tests were abnormal for all of the unimproved patients (five months to two years after cholecystectomy). Two-thirds (14 of 21) of the clinically improved patients showed some evidence of disturbed hepatic function one month to one and one-half years after the operation.

RÉSUMÉ

(1) On fait une étude de tests de la fonction hépatique dans une série de 129 malades cholécystectomisés. Ces malades présentaient de la cholécystite chronique avec calculs. On attira l'attention sur la sensibilité du test au thymol troublé et des tests de flocculation céphaline-cholestérol; tous les deux sont plus

sensibles que les tests employés auparavant

(2) On met en évidence le mauvais fonctionnement hépatique chez 28% des malades de cette série

(3) Les études qui suivent, portant sur 27 patients, montrent une amélioration clinique dans 78% des cas et pas d'amélioration dans 22% Les résultats des tests de la fonction hépatique furent anormaux pour tous les malades non améliorés (5 mois à 2 ans après lo cholécystectomie) Deux tiers (14 sur 21) des malades améliorés cliniquement présenterent quelques symptômes de foonction hépatique troublée depuis un mois jusqu'à une ou une année et demi apres l'opération

RESUMEN

1 Se ha estudiado la función hepática mediante una serie de pruebas en 129 pacientes colecistectomizados para tratarles de colecistitis crónica calculosa Las pruebas mas exactas resultaron ser las de la turbidez del timol y la de la floaculación de la cefalina colesterol, que son mucho mas sensibles que todas las usadas anteriormente

2 Se hallaron síntomas de disfunción hepática *en el 28 por ciento de los pacientes estudia*dos en la presente serie

3 Los estudios realizados en 27 pacientes después de ser intervenidos, revelaron una mejoría clínica en el 78% de los casos, no mejorando el 22% de los pacientes Los resultados de las pruebas de la función hepatica fueron anormales en todos los pacientes que no habían mejorado (cinco meses a dos años después de la colecistectomía) Dos tercios (14 de 21) de los pacientes mejorados clínicamente presentaron ciertos signos de alteraciones de las funciones hepaticas, de un mes a un año y medio despues de la operación

RIASSUNTO

(1) Hanno eseguito prove funzionali del fegato in 129 pazienti operati di colecistectomia per colecistite cronica e colelitiasi Attribuiscono un particolare valore al metodo di torbidita' col timolo ed al metodo di flocculazione con cefalina colesterina ambedue piu' sensibili dei metodi usati in precedenza

(2) Nel 28% di questi pazienti hanno notato segni di disfunzione epatica

(3) Controlli a distanza sopra 27 pazienti hanno dimostrato un miglioramento clinico nel 78% dei casi nel 22% il miglioramento e' mancato

In tutti i casi non migliorati, le prove funzionali hanno condotto (da 5 mesi a 2 anni dopo l'operazione) a dei risultati anormali Qualche disturbo funzionale e' stato notato anche nei 2/3 dei casi (in 14 sopra 21) migliorati clinicamente in questo gruppo di casi il controllo ha oscillato da un minimo di 1 mese ad un massimo di 1 anno ½ dopo l'operazione

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Rectosigmoid Anastomosis by Invagination in Chronic Inflammatory Conditions

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ANASTOMOSIS by invagination makes possible the reestablishment of continuity between the rectum and the sigmoid under some conditions in which other methods would not be applicable. End-to-end anastomosis is technically difficult in the depth of the pelvis and requires mobilization and accurate suturing of approximately normal pliable bowel. Anastomosis by invagination is much easier of performance, as the rectal end is not mobilized and the sigmoid is held within it by a tube passing through the anal orifice, few if any sutures being placed at the line of anastomosis.

This type of anastomosis is particularly applicable when chronic inflammatory processes prevent mobilization of the rectum without damage to it. In such cases the anastomosis is not done at the time of the primary operation, on account of the attendant risk, but is done as a secondary procedure. Owing to the lack of a firm and accurate approximation of the bowel ends by suture and the presence of chronic local inflammatory changes, it is important that the anastomosis be protected against factors that may cause leakage. Protection is best accomplished by a preceding transverse colostomy. This permits better preparation of the bowel, minimizes the danger of peritonitis from leakage at the site of the anastomosis, reduces the likelihood of abdominal distention and affords a safe means of dilating the site of anastomosis and ascertaining its adequacy before it is permitted to function.

When a transverse colostomy has not been made and there is a sigmoid colostomy that must be abandoned to permit mobilization of the sigmoid to a sufficient extent to reach the rectum, particular care must be taken in preparation of the bowel and in the use of measures to prevent postoperative distention.

TECHNIC

At operation the colon is mobilized sufficiently to permit its end to reach the rectum. This may be difficult because of extensive adhesions and because it has been shortened by resection of its diseased portion. It may be necessary to free the splenic flexure. The rectal stump is located by palpating the end of a tube that has been passed through the anal orifice. The end of the tube is drawn into the abdominal cavity through an incised opening made into the rectum, just large enough to permit a snug fit of the end of the sigmoid. No rectal mucosa is excised. The rectal tube is passed about 8 cm. into the sigmoid and secured against slipping and leakage by a heavy encircling transfixion suture (Fig. 1). By traction upon the rectal tube, the sigmoid, with mesentery attached, is drawn into the rectum until a section of reasonably intact bowel is engaged for a length of several centimeters (Figs. 2 and 3). The proximal end of the rectal tube should be above the level of the rectal stump. Several sutures may be placed in the region of the anastomosis, but the end of the sigmoid is held in place mostly by the rectal tube, which is prevented from slipping by securing a gauze sponge around it just outside of the anal orifice (Fig. 3). The tube is kept open by irrigation and permits the passage of gas and liquid feces. The sutures holding it to the sigmoid slough out, and it may be withdrawn or expelled about the seventh day. After its removal there is commonly some constriction, probably due to edema of the invaginated portion of sigmoid. This is overcome by dilation, which is most safely carried out by drawing bougies from above downward on a guide string that has been passed through the distal colostomy opening downward to the outside through the anal orifice. When a colostomy is not present, dilation must be deferred for two weeks or longer, until the anastomotic union is secure, and then carried out by gently passing soft rubber bougies upward through a proctoscope under direct vision. Once an adequate lumen has been established there is no tendency to re-formation of stricture. The invaginated portion of bowel sloughs off or shrinks so that the site of anastomosis is recognized only by a slight but irregular redundancy of the mucosa. The function of the rectum becomes normal.

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COMMENT

Rectosigmoid anastomosis by invagination is not a new procedure In 1908 Mummery[1] reported using it with success as a means of restoring bowel continuity in a case of resection of the sigmoid for a neoplasm Shortly thereafter, in a communication to the editor of the *Lancet*, G Grey Turner[2] stated that J Rutherford Morison[3] had devised and carried out the identical operation in 1896 and that up to the publication of his paper in 1901 he had performed the operation fourteen times Although it had sometimes been wonderfully successful, the mortality had been high and it had been almost entirely superseded by other methods He predicted that Mummery would have the same experience if he persisted in using it In 1918 Stillman[4] reported the use of this procedure in cases of obstruction due to tumor of the lower sigmoid After resection he closed the end of the sigmoid with an inversion suture and invaginated it into the rectum, denuded of its mucosa He attributed his success to the fact that the occluded, distended sigmoid firmly approximated the rectum, thus preventing leakage and favoring firm healing Drainage was instituted through the vagina or below the end of the coccyx A fecal fistula of one to several weeks' duration occurred in about a third of the cases Stillman considered this operation preferable to a colostomy or a two stage procedure Invagination of the sigmoid into the rectum by traction from below has been used by Balfour[5] as a means of immobilizing the bowel while making an accurate suture anastomosis after resection

In spite of its long history and its prominent advocates, anastomosis of the rectum to the sigmoid by invagination without accurate suturing has gained little popularity This is partly accounted for by the fact that it has been used mostly as a primary form of anastomosis at the time of extensive bowel resection When used in this manner it is accompanied by high morbidity and mortality rates Also better preparation of the patient and technical improvements in operating and anesthesia have made end to end anastomosis by accurate suturing preferable in most cases Anastomosis by invagination is particularly indicated when chronic inflammatory changes prevent satisfactory mobilization of the rectum and make it impossible to obtain sufficiently pliable and intact ends of bowel to permit accurate approximation by suture When the procedure is used under these conditions it is most important that the site of anastomosis be protected preferably by a preliminary transverse colostomy or by an accompanying tube cecostomy and intestinal intubation Three consecutive cases with successful results are reported

REPORT OF CASES

Case 1 —W A, a critically ill Negro aged 43 was admitted to the Roper hospital May 5, 1940, with a diagnosis of intestinal obstruction of five hours' duration At operation, a few hours later, massive volvulus of both small and large intestine was observed There was resected 260 cm of ileum and jejunum and 25 cm of terminal sigmoid colon all of which was gangrenous The proximal end of the small intestine was anastomosed to the ileum, an enterostomy being made proximal to the anastomosis The proximal end of the sigmoid was brought out through a left muscle splitting incision The

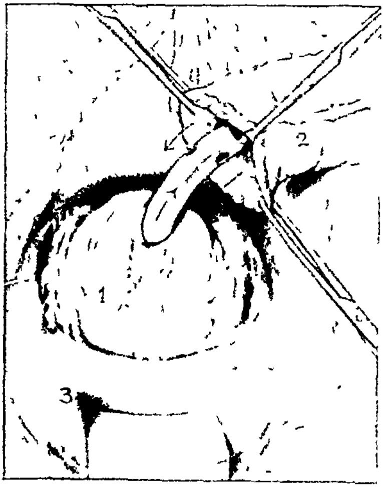


Fig 1 —Tube passed per anus through incision in rectal stump and introduced into mobilized end of sigmoid colon *1*, rectum, *2*, sigmoid [illegible]

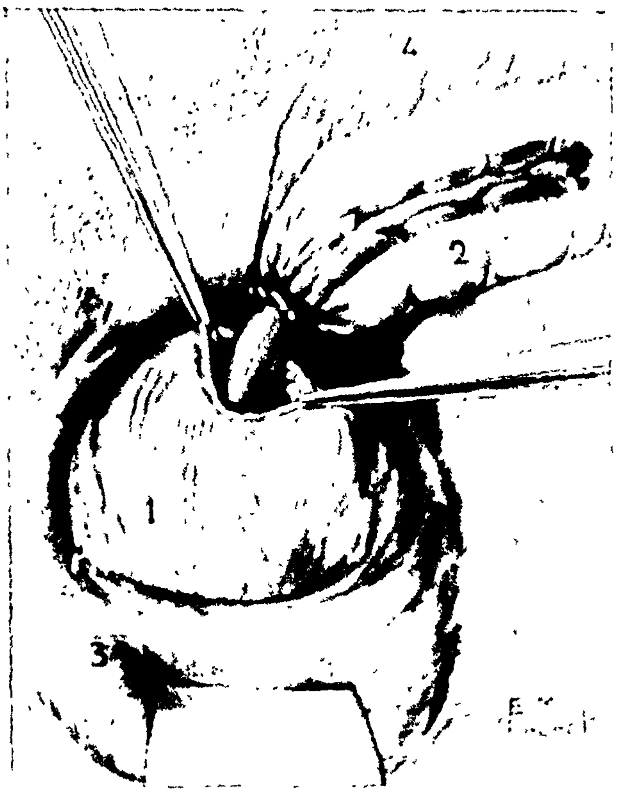


Fig. 2.—End of sigmoid colon being invaginated into rectum. *1*, rectum; *2*, sigmoid; *3*, bladder; *4*, sigmoid mesentery.

distal end, which was at the pelvic brim, was closed by inversion.

Convalescence from this operation was remarkably smooth. The enterostomy closed spontaneously and the colostomy functioned well. On June 25 a transverse colostomy was made at the upper end of a left paramedian incision after exploration had revealed that the remaining sigmoid was of sufficient length to be brought down to the rectum. On July 16, through a low left rectus muscle-splitting incision, after many adhesions had been severed, the end of the sigmoid was mobilized by freeing its colostomy attachment to the anterior abdominal wall and dividing its lateral peritoneal reflection. The end of the sigmoid was invaginated into the rectum according to the technic aforedescribed. Beginning July 26, ten days after the operation, attempts were made to irrigate the rectum through the distal colostomy opening to establish continuity at the site of anastomosis. On August 13 proctoscopic examination revealed redundant mucosa and some feces. On August 29 a Levine tube was passed through the colostomy and delivered through the anal orifice. Gradual dilation of the anastomotic site was then accomplished by pulling bougies from the colostomy through the anal orifice on a guide string. The moderate constriction was easily dilated. On October 1 closure of the colostomy was started by crushing the spur; this was completed November 22. On November 30 the patient was discharged in good condition, having normal bowel movements. On examination Dec. 29, 1941, more than a year later, he was enjoying good health, had normal intestinal function and had resumed his job of doing heavy labor in a fertilizer factory.

CASE 2. On April 10, 1946, M. B., a normally developed, well nourished Negress aged 48, was admitted to the gynecologic service of the Roper hospital with a diagnosis of fibromyomata uteri and cardiovascular hypertensive disease. At operation, on April 12, large myomata uteri and extensive adhesions in the pelvis were observed. At completion of supravaginal hysterectomy it was noted that the mesentery of the lower sigmoid had been torn badly and that the upper portion of the rectum had been stripped of serosa and muscularis. The patient had been in shock for an hour. At this time I was requested to render assistance. The damaged portion of the rectum and sigmoid was resected. As anastomosis was considered inadvisable, the open end of the rectum was closed by an inversion suture and the terminal end of the sigmoid was brought out through an incision in the lower left quadrant to serve as a colostomy. The floor of the pelvis was peritonealized as well as possible, and rubber tissue drains were passed through the cervical canal into the vagina. Closure of the midline abdominal incision was made with chromic catgut for the posterior layer and alloy steel wire for the anterior rectus sheath. Skin sutures were placed but were not tied until five days after operation. The convalescence was reasonably smooth. The patient was discharged May 7, 1946, at which time her general condition was good and the colostomy was functioning well. On October 2 she was readmitted for re-establishment of bowel continuity. Proctoscopic examination showed the inverted end of the rectum to be 12 cm. from the anal orifice. As a transverse colostomy was not planned, a Miller-Abbott tube was passed prior to operation. At operation on October 7, with continuous spinal anesthesia, a low left paramedian incision was made. Intestinal adhesions were freed so as to expose the pelvis. An incision was made in the rectal stump, which was located flush with the vault of the vagina as determined by palpation of forceps placed both in the vagina and in the rectum. The sigmoid was mobilized by freeing its colostomy attachment to the abdominal wall and severing adhesions and its lateral and medial peritoneal attachments. The end of the sigmoid was invaginated into the rectum by the technic described above. The

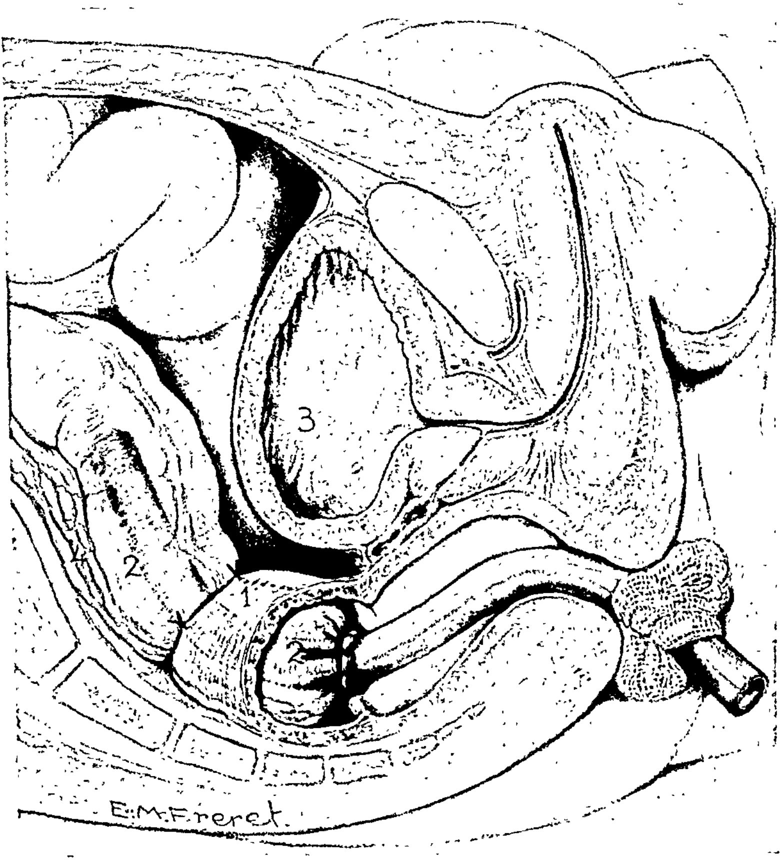
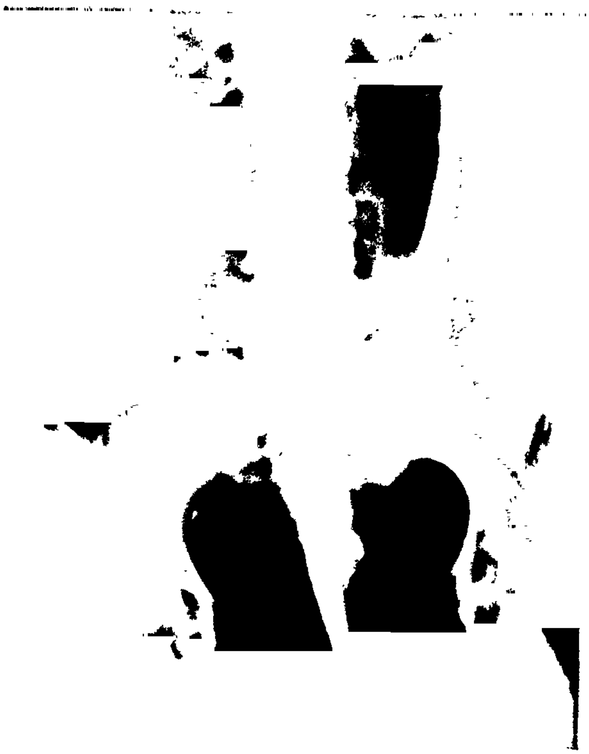


Fig. 3.—Operation completed. End of sigmoid [illegible] *er tube held in sigmoid by circular* transfixion suture. Gauze fastened to tube at a [illegible] *1*, rectum; *2*, sigmoid; *3*, bladder; *4*, [illegible]

appendix was removed, and a catheter was passed through its stump into the cecum as an additional safeguard against distention. Closure of the abdominal incision was made with chromic catgut for the posterior layer and alloy steel wire for the anterior layer. Skin sutures were placed for delayed closure. Except for a profuse watery discharge through the rectal tube on the third day after operation the patient did not have a bowel movement until the ninth postoperative day. During this time she was given a liquid diet and the Miller-Abbott tube was kept in place. Probably bowel movements



merous adhesions and freeing it at the site of the first colostomy A mass of inflammatory tissue that included a section of badly damaged colon was excised Only after mobilizing the descending colon and the splenic flexure was it possible to approximate the end of the colon to the rectum The end of the sigmoid was invaginated into the rectum by the technic described above The incision in the abdominal wall was closed with chromic catgut in the posterior layer and interrupted cotton in the anterior layer, alloy steel wire not being available Skin sutures were placed but not tied for several days The thick subcutaneous layer became infected requiring subsequent partial excision of the wound with removal of cotton sutures On November 19 the patient had her first bowel movement by rectum On November 26, dilatation of the anastomotic site was started with esophageal bougies pulled through the distal colostomy opening by a guide string which had been passed from the colostomy downward through the anal orifice (Fig 4) This was continued over the next two weeks without difficulty Roentgen examination showed the colon to be almost straight from the transverse colostomy to the anal orifice (Fig 5) On Jan 2, 1947, an attempt to close the transverse colostomy was abandoned owing to inadequate preparation of the proximal bowel On January 30, closure of the colostomy was accomplished with some difficulty, therefore a tube cecostomy was performed On February 12 the patient was discharged in good condition On February 24 her bowel movements were normal On proctoscopic examination there was seen an irregularity of the mucosa at the 13 cm level above the anus The lumen appeared adequate, but the proctoscope could not be passed through it on account of fixation of the bowel

SUMMARY AND CONCLUSIONS

Rectosigmoid anastomosis by invagination is possible in some cases in which end to end suture cannot be performed satisfactorily A brief review of the subject is presented Three consecutive successful cases are reported

RÉSUMÉ ET CONCLUSIONS

L'anastomose rectosigmoide par invagination est possible dans quelques cas pour lesquels la suture bout à bout ne peut être réalisée d'une façon satisfaisante On fait un rapide tour d'horizon sur ce sujet Trente deux cas consécutifs opérés avec succès sont rapportés

RESUMEN Y CONCLUSIONES

La anastomosis rectosigmoidea por invaginacion es posible en algunos casos en los que no puede practicarse satisfactoriamente una sutura término terminal El autor presenta una breve exposicion del tema, comunicando luego tres casos consecutivos satisfactoriamente tratados

RIASSUNTO

L'anastomosi retto sigmoidea per invaginazione e' possibile in taluni casi, nei quali una sutura termino terminale non puo' essere eseguita con sufficiente perfezione

Descrive tre casi del genere, passando in rassegna la letteratura sull'argomento

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Repair of Single Cleft Lip by the Hagedorn-Le Mesurier Technic

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IN 1892 Hagedorn described a method of single cleft lip repair that has been overlooked in the passage of time. Le Mesurier has more recently revived the method, and its use has produced very gratifying results at this clinic.

The method may be used with equal success for complete and incomplete clefts, and we have found it highly satisfactory in secondary cleft lip repairs also. The advantages of the technic are that it (*1*) avoids the necessity of heavy skin sutures, (*2*) produces a more normal philtrum border, (*3*) eliminates an off-center scar, (*4*) equalizes the thickness of the mucous membrane, and (*5*) results in a more nearly normal cupid's bow.

General Considerations.—Though cleft lips are encountered and are satisfactorily repaired in patients of all ages, we feel that the earliest age at which repair can be carried out is best. Not only does the baby tolerate the operation well, but the mother is spared unduly prolonged heartache. If the baby is seen soon after birth, we prefer to operate after 6 to 10 days of life. However, the weight must be 6 pounds (2,721.5 Gm.) or more and the condition otherwise normal and healthy. If these conditions are not fulfilled we wait until the weight is 6 pounds and the baby is gaining at a normal rate. Early operation on babies with clefts in the alveolar ridge is especially indicated, because increasing calcification in the maxillae makes the moulding of the upper jaw and closure of the alveolar cleft by lip pressure much more difficult. If the operation is delayed too long, closure will not be accomplished and the subsequent palate repair is much more difficult.

Preparation. — For infants, paregoric or elixir phenobarbital is given in a regular feeding one hour before the operation.

Anesthesia.—Local anesthesia induced by a few drops of 0.5 per cent novocaine injected at each infraorbital foramen and at the base of the columella is usually sufficient for either infants or adults. Only for older children is general anesthesia occasionally used. In our opinion, general anesthesia is more dangerous for very young infants, especially when given by other than expert anesthetists. Under local anesthesia the infant retains his pharyngeal reflexes, and there is much less danger of aspiration or asphyxia.

TECHNIC

The width of the normal side of the lip is used as a guide in determining the desired width of the cleft side (Fig. 1). A measurement is taken with calipers from the base of the normal nostril to a point ⅛ inch (0.32 cm.) from the vermilion border of the normal side. This measurment (*X-Y*) is used as a guide for the other measurements and the calipers are left at this setting (*1*, Fig. 1). Point *A* is located at the base of the affected nostril on the median side of the cleft. Point *B* is located on the vermilion border at *X-Y* distance from *A*. Point *C* is located in midline of the philtrum ⅛ inch (0.32 cm.) from the vermilion border. Point A^1 is located at the base of the affected nostril lateral to the cleft. Point B^1 is located ⅛ inch (0.32 cm.) from the vermilion border and *X-Y* distance from A^1 (*1* and *2*, Fig. 1).

With an 11 B-P blade an incision is made through the entire thickness of the lip along the vermilion border from *A* to *B*. Then the incision is extended from *B* to *C*. On the lateral side of the cleft an incision is made through the lip from A^1

From The Straith Clinic for Oral and Plastic Surgery, Detroit.

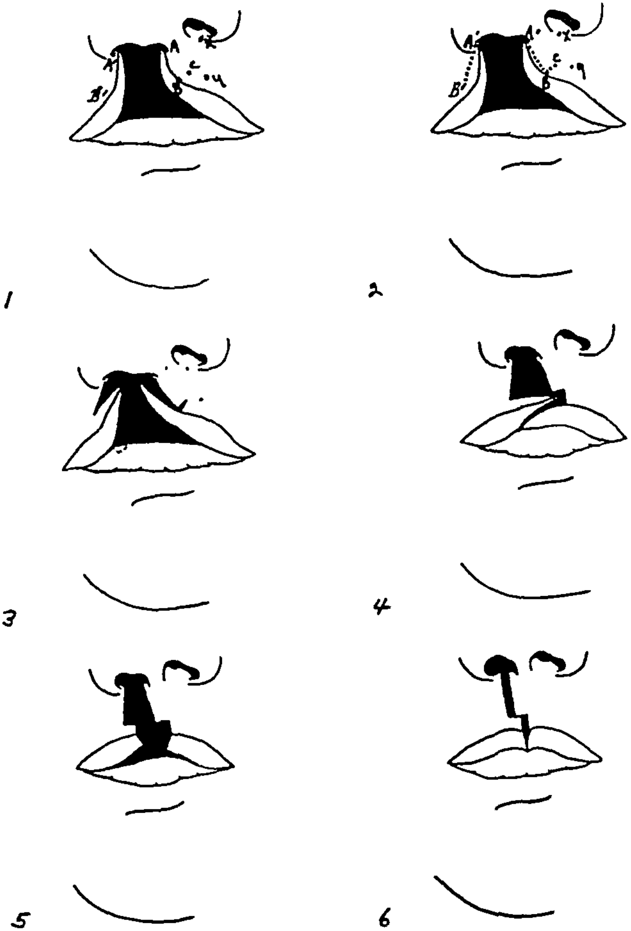

Fig 1.—Hagedorn Le Mesurier technic for repair of single cleft lip *1*, orientation diagram (For location and explanation of points *A*, *B*, *C*, *A*¹, *B*¹, X and Y, see text) *2* and *3*, incision made from *A* to *B* to *C* and from *A*¹ to *B*¹. *4* resulting flap of skin and mucous membrane lateral to the cleft, which is designed to fill the defect created on the medial side of the cleft *5*, excess of skin and mucous membrane of the lateral flap and excess of mucous membrane of the medial flap excised *6*, final plan of approximation The vermilion border is carefully approximated and the mucous membrane everted as shown

Fig. 2.—*Left*, preoperative appearance of complete unilateral cleft lip. *Right*, postoperative appearance.

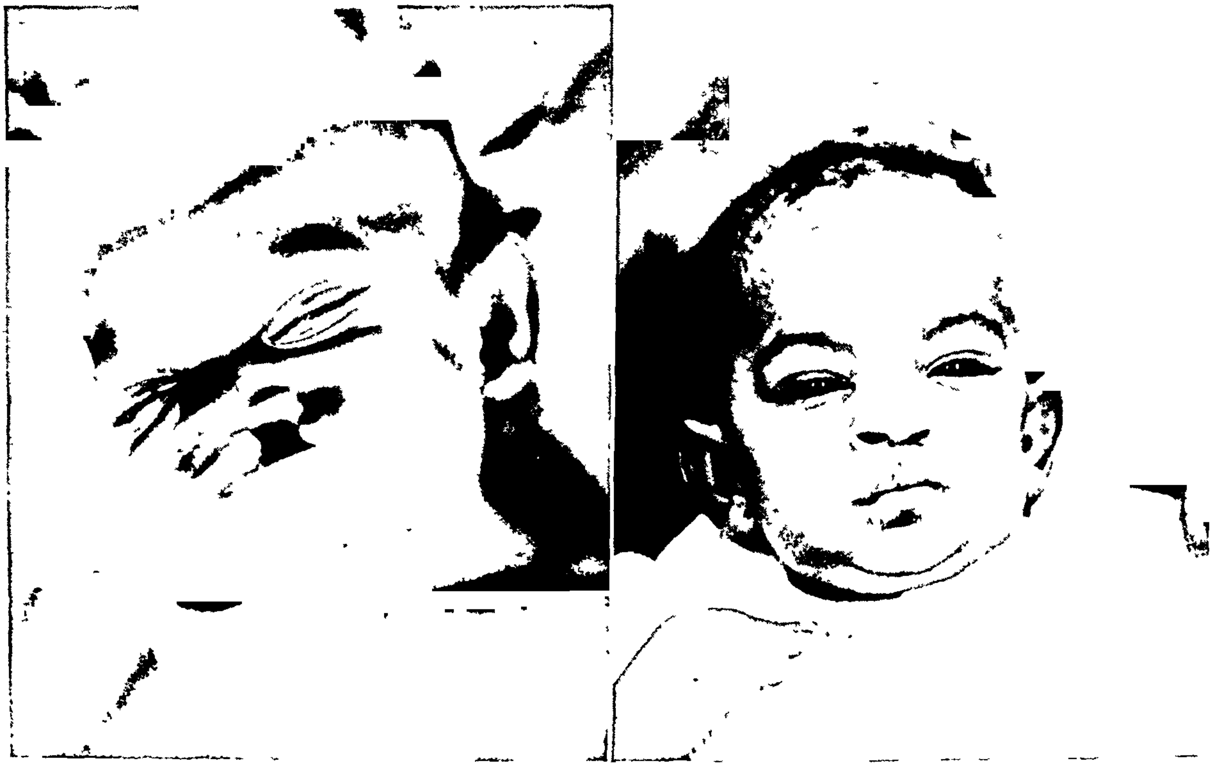

Fig. 3.—*Left*, preoperative appearance of complete cleft lip. *Right*, appearance four weeks after the operation.

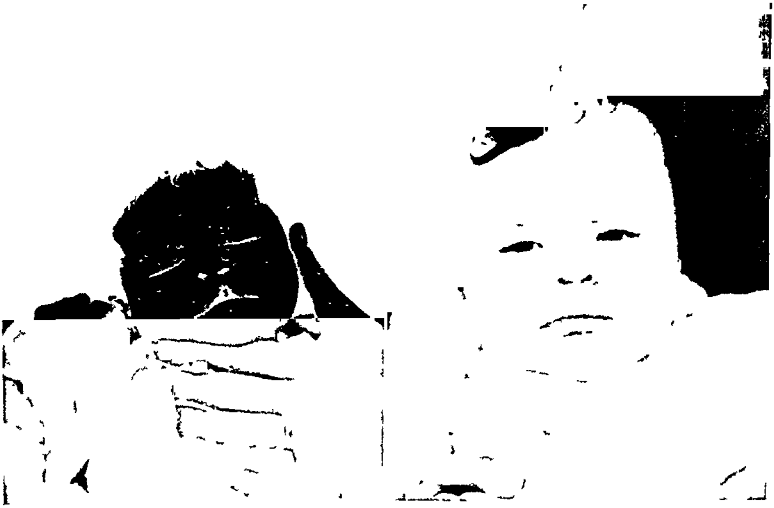

Fig 4 —*Left,* incomplete cleft lip *Right,* postoperative appearance

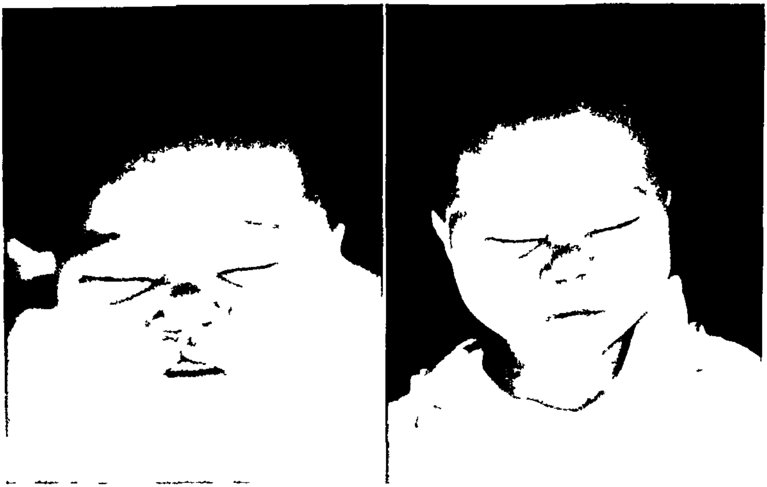

Fig 5 —*Left,* incomplete cleft lip before operation *Right,* postoperative appearance

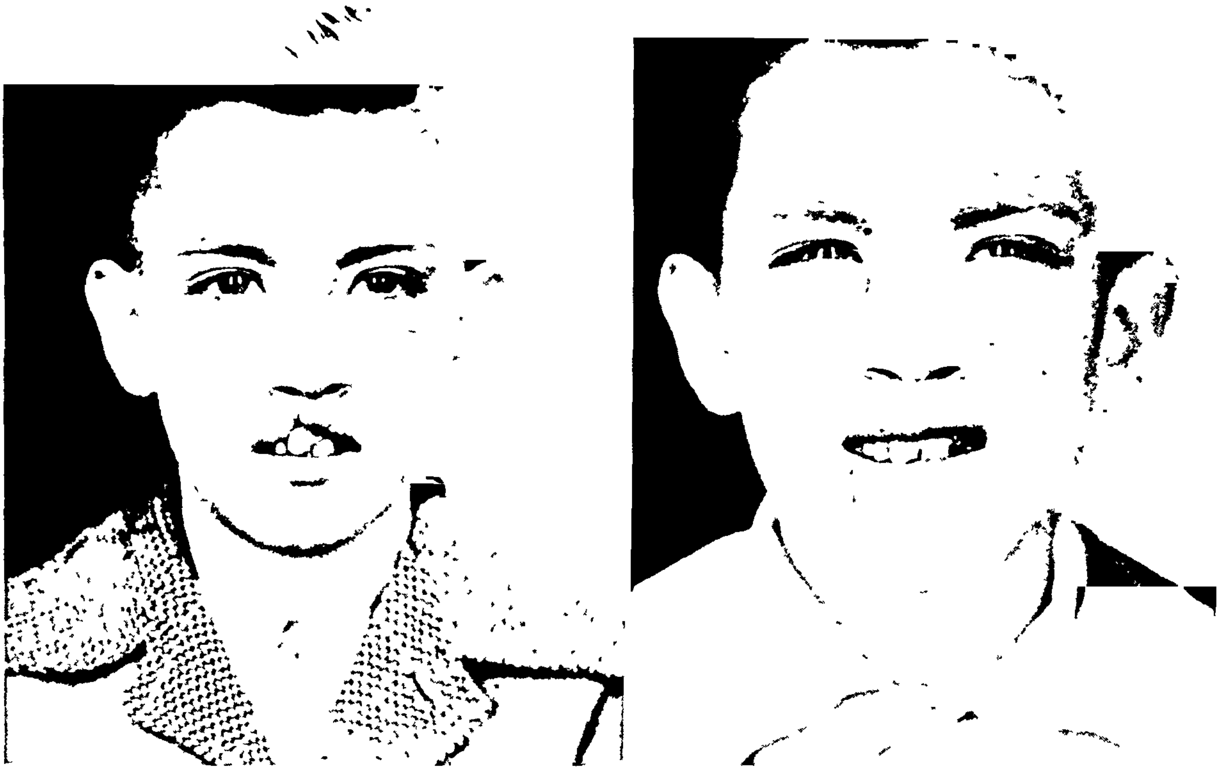

Fig. 6.—*Left,* incomplete cleft in older child. *Right,* appearance eight weeks after the operation.

to B^1 (*2* and *3*, Fig. 1). Even if the cleft is incomplete the incisions are carried up into the floor of the nostril, as it is nearly always too wide on the side of the cleft, and there is a dehiscence of the muscle making a groove in the skin above the cleft (Figs. 6 and 7).

The lip is freed from the maxilla in order to mobilize it and prevent tension on the suture line. Adequate mobilization is important both for the lip and for the ala. Next, a small step that is more important than its simplicity suggests is the splitting of the cut edges of the lip slightly, to insure eversion of the skin edges.

The cut edges are now brought together by hooks to provide a preview of the repaired lip (*4*, Fig. 1). Usually there will be noted a wider nostril base on the cleft side, necessitating further excision at that point.

Three figure-of-eight sutures of 4-0 nylon (2-0 nylon may be used for adults) are introduced from beneath the lip to relieve tension and are tied under the lip.

Then the flaps are fitted together as shown in *5* and *6*, Figure 1, the excess being cut off so as to leave the lower end of the scar in the midline. Often a small triangle of skin at *B-C* must be excised along with the mucous membrane to make the line of suture perpendicular in the midline. A

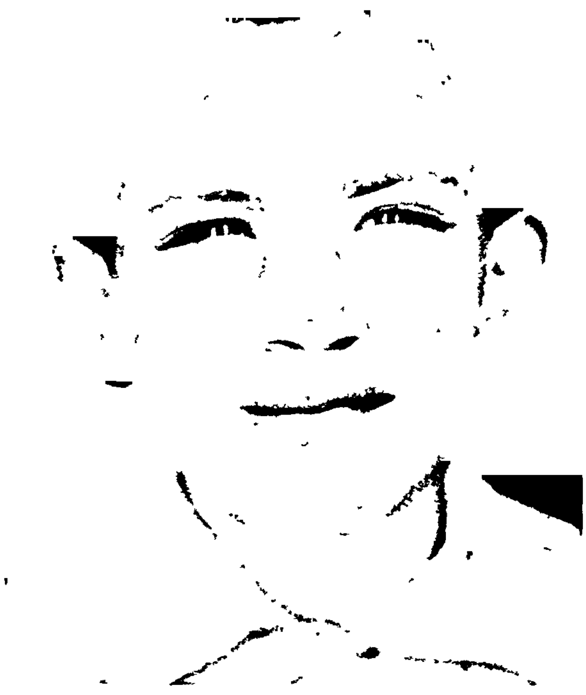

Fig. 7.—Close-up view of lip.

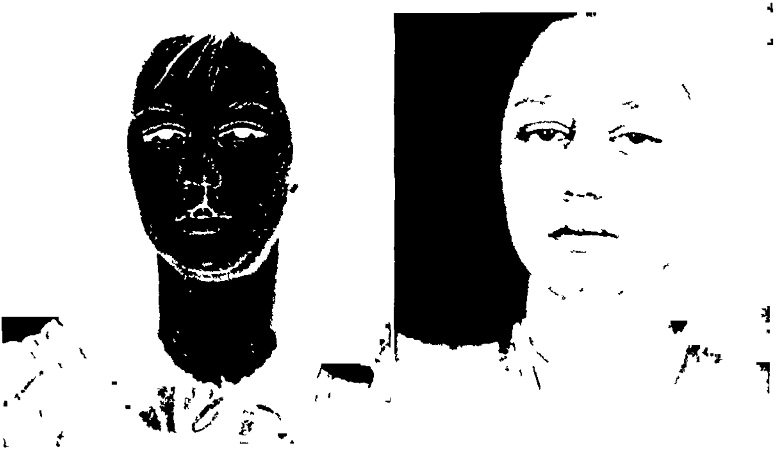

Fig. 8.—*Left,* incomplete cleft of lip. *Right,* postoperative appearance.

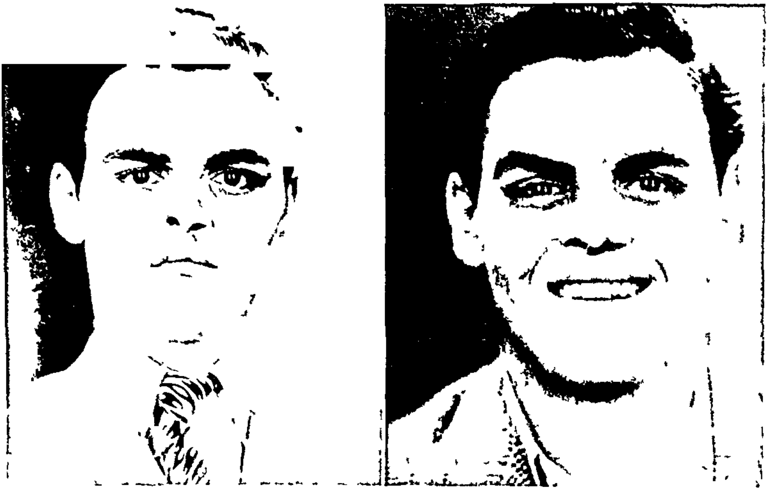

Fig. 9.—*Left,* unilateral cleft lip repaired in childhood, revealing asymmetry of nostrils [illegible] red border. *Right,* postoperative result.

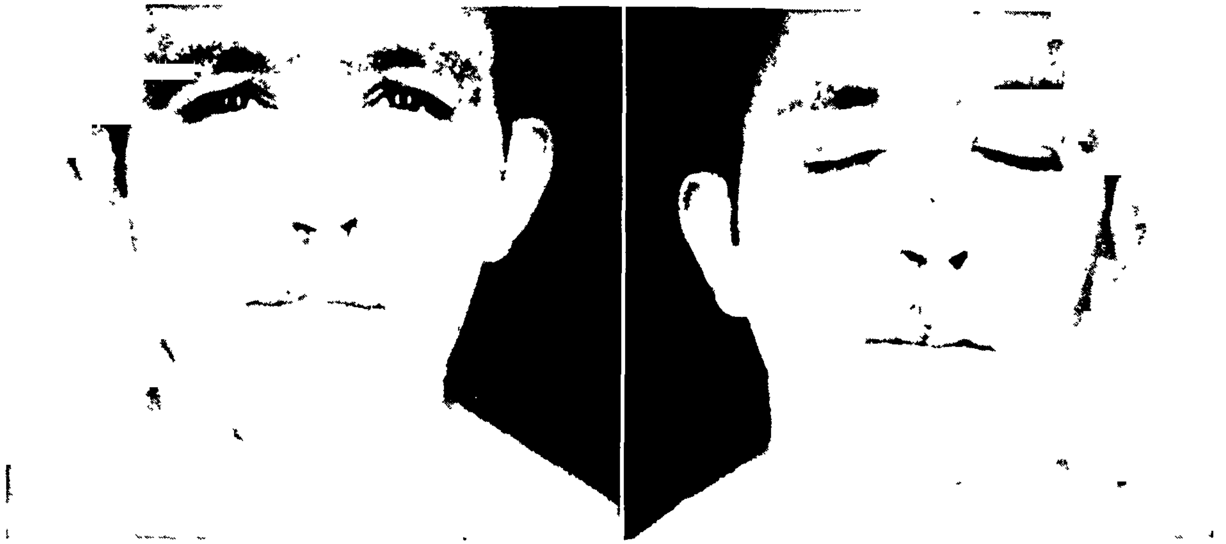

Fig. 10.—*Left,* unilateral cleft lip repaired at the age of 28. *Right,* immediate postoperative result of secondary repair by the Hagedorn-Le Mesurier technic. Subcuticular sutures were used in the upper part of the wound.

small amount of excess mucous membrane is left on each flap and is everted in order to finish the cupid's bow in the midline (*6*, Fig. 1). The skin is closed with interrupted sutures of 8-0 black silk and the mucous membrane with horsehair or nylon.

Since the lip of the shorter side of the cleft is usually thicker, an ellipse of mucous membrane is excised from the under surface to equalize the two sides.

A Logan traction bow is applied for further relief of the tension on the skin sutures. No dressing is applied; therefore the lip may be cleaned as often as necessary with hydrogen peroxide or boric acid solution. Penicillin ointment applied over the lip often prevents crusting.

One half of the skin sutures are removed in two or three days and the remainder in four to five days. The mucous membrane sutures are removed in one week, and the nylon figure-of-eight sutures and the Logan traction bow are removed in ten days to two weeks.

Examples of different types of left lips required by this technic are shown in Figures 2 to 9 inclusive.

SUMMARY

The Hagedorn cleft lip technic as revived by LeMesurier is described, and some results are shown. The technic has been used almost exclusively in this Clinic for the past three years, and in our opinion it gives more consistently good results than does any other. The advantages, as we see them are that it (*1*) avoids the need of heavy skin sutures; (*2*) produces a more nearly normal philtrum border; (*3*) eliminates an off-center scar; (*4*) equalizes the thickness of the mucous membrane, and (*5*) results in a cupid's bow approximating the normal.

RÉSUMÉ

La technique de Hagedorn pour la fente labiale telle qu'elle fut ressuscitée par Le Mesurier, est décrite, et on montre quelques résultats. Cette technique a été employée presque exclusivement dans la Straith Clinic durant ces trois dernières annés, et dans l'opinion des auteurs elle donne des résultats plus constants que n'importe quel autre. Ses avantages sont que: (1) elle évite de faire de grosses sutures de la peau (2) elle produit une bordure presque normale de la lèvre supérieure; (3) elle supprime l'escharre en dehors de la partie centrale; (4) elle égalise l'épaisseur de la membrane muqueuse et (5) les résultats du dessin de l'arc de Cupidon approchent de la normale.

RIASSUNTO

Descrive la tecnica operatoria di Hagedorn, riesumata da Le Mesurier, per la cura del labbro leporino. Quest'operazione e' stata sempre adottata—durante gli ultimi tre anni—nella clinica diretta dall'A., perchè offre in

confronto alle altre operazioni i seguenti vantaggi

1) Evita la necessita' di robuste suture cutanee

2) Conduce alla formazione di un margine quasi normale del solco infranasale

3) Elimina l'inconveniente di una cicatrice deviata dalla linea mediana

4) Uniforma lo spessore della mucosa

5) Ripristina in modo quasi perfetto l'arco di cupido

RESUMEN

Se describe la técnica de la Mesurier para tratar el labio leporino presentandose los resultados obtenidos en algunos casos Esta técnica se ha empleado casi exclusivamente en la clínica Straith, durante los ultimos tres años y a juicio del escritor ha dado resultados favorables de un modo mas consistente que ninguna otra técnica Las ventajas de la misma son (1) elimina la necesidad de suturas cutaneas gruesas, (2) deja un borde del surco medio en el labio superior mas similar al normal, (3) elimina una cicatriz desviada del centro, (4) nivela el espesor de la membrana mucosa (5) determina una configuracion del arco de cupido mas parecida a la normal

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Treatment of Achalasia: Transthoracic Approach

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THE subject of achalasia is by no means new. The term refers to a functional derangement of the lower part of the esophagus with dilatation of the upper part and delayed passage or retention of food. It has been described under various terms, such as cardiospasm, ectasia, idiopathic dilatation of the esophagus, paralytic dilatation of the esophagus, and mega-esophagus (comparable to the term megacolon). References were made to this subject as far back as 1674, when various instruments were devised to dilate the lower end of the esophagus as it enters the stomach. Achalasia is observed rather frequently and is secondary only to carcinoma of the esophagus as a cause of difficulty in swallowing. According to Scheibel, 17.8 per cent of all esophageal lesions are due to achalasia. The subject becomes extremely important, since differential diagnosis from carcinoma of the esophagus must be made.

ETIOLOGY

The cause of achalasia is not definitely understood, but is more or less accepted as neurogenic. It is our opinion that the condition is the result of degeneration or destruction of the ganglions and connecting fibers of Auerbach's plexus, producing a loss of coordination in the circular muscle fiber action of the various segments of the esophagus and manifesting itself chiefly by constriction of the circular muscle fibers in the lower fourth of the esophagus and dilatation of the upper two thirds. The actual destruction of ganglions and connecting nerve fibers of Auerbach's plexus and the loss or absence of ganglion cells of the myenteric plexus have not been proved pathologically, as the work on this problem is not yet complete. Etiologically the condition is comparable to pyloric stenosis, in which there is marked hypertrophy of the circular muscle fibers; and in keeping with the recent and excellent work of Swenson of Boston (*Congenital Megacolon*) it is our impression that achalasia and this condition are likewise comparable. In Swenson's interpretation, congenital megacolon resembles a chronic obstruction with subsequent dilatation of the colon resulting from constriction of the circular muscle fibers in the rectosigmoid segment, and in achalasia an identical condition occurs as a result of constriction of the circular muscle fibers in the lower fourth of the esophagus. The esophageal hiatus of the diaphragm plays no part in this condition, and a diaphragmatic pinchcock mechanism does not exist in many cases. In the 4 cases presented in this paper the circular muscle fibers of the lower fourth of the esophagus all showed marked hypertrophy, and in 1 case there actually existed a bulb formation, similar to that observed in pyloric stenosis, made up completely of circular muscle fibers.

SIGNS AND SYMPTOMS

1. Pain. This symptom is present in 60 to 70 per cent of the cases, in sharp contrast to its absence in cases of carcinoma. The pain may occur at any time during the day or night and is not especially related to eating. It is retrosternal and may radiate into the cervical region at the angle of the jaw and the mastoid region. It may be felt in the epigastrium, or it may be felt in the back at the level of the tenth, eleventh, and twelfth thoracic vertebrae.
2. Dysphagia. The patient complains of marked difficulty in swallowing food, frequently stating that fluids can be ingested, but that no solid food will pass. The reverse is also described at times.
3. Regurgitation of food.
4. Loss of weight.
5. Inability to take cold foods and cold drinks.

Read at the Fourteenth Annual Assembly of the United States Chapter, International College of Surgeons, Atlantic City, N. J., November 1949.

METHODS OF TREATMENT

In 1914 methods were described by Heller of dividing the musculature anteriorly and posteriorly permitting the mucosa to remain intact, as for pyloric stenosis. This was done by the subdiaphragmatic route. In 1910 Heyrovsky described a successful side to side anastomosis between the esophagus and the cardia of the stomach. Esophagogastrostomy by the subdiaphragmatic route has brought about excellent results.

Indications for Surgical Treatment.—Operation is indicated as follows:

1. When roentgen examination discloses that, because of increased length of the esophagus with a sigmoid or a flask shaped contour, dilation is difficult and dangerous and must be kept up more or less continuously.
2. When the patient under proper care as to rest and type of food is reasonably free from emotional exacerbations but requires frequent dilations (once a week or several times a month).
3. When the patient is geographically or financially unable to have frequent dilations.
4. When the patient does not tolerate the procedure and because of fear and pain is unable to learn the use of bougies even with medical aid.
5. When all methods of conservative treatment have failed and all attempts to eradicate emotional stress and strain have been unsuccessful, the patient being still unable to swallow, still in pain and still losing weight. Surgical intervention under these circumstances should be planned according to the best judgment of the operating surgeon.

REPORT OF CASES

Four patients have been operated on by me for achalasia. The transthoracic approach through the ninth rib has been used in each case. All patients whose cases are presented here have been treated conservatively; in 2 cases dilation was performed, and in 2 it was rejected. Retrosternal pain, dysphagia, regurgitation and loss of weight were present in every case.

CASE 1.—Mr. M. C., aged 42, was admitted to the West Penn Hospital Dec. 12, 1948. A diagnosis of achalasia had been made previously in one of the clinics, based on the patient's inability to swallow. The patient had sustained an injury two years previously, when he was struck in the right side of the chest, causing the fracture of two ribs. Three months later he noticed difficulty in swallowing. Complete obstruction was never present, as the patient could swallow liquid, but total obstruction existed as far as solid foods were concerned. There was also a history of domestic difficulties which caused the patient considerable worry. Three months after the onset he was studied in one of the outstanding clinics. A diagnosis of achalasia was made, and dilation was performed. Relief was obtained and lasted seven to eight months. The patient was not able to take solid foods well; he had lost weight up to 30 pounds (14.1 Kg.). He was admitted to the West Penn Hospital Dec. 12, 1948. Roentgenograms were taken and revealed a smooth olive-tip type of obstruction in the lower fourth of the esophagus, with dilatation of the esophagus above this point. The roentgen films also revealed the possibility of a small diverticulum, which made dilation somewhat hazardous. In spite of this dilation was advised and antispasmodics were administered, but the patient stated that he had "been on a trial period" of such treatment previously without any success. He further stated that he preferred surgical operation.

The other outstanding features in this case were auricular fibrillation and some dilatation of the left auricle, which added to the hazards of the operation. The patient was prepared for operation with proper fluids and supportive measures, and on December 16 the left side of the chest was opened through the ninth rib and the lower end of the esophagus was exposed. Approximately 1 inch (2.5 cm.) above the hiatus was a bulbous formation made up of hypertrophied circular muscle fibers. In this case, as in all the others, the stomach was opened and a finger inserted into the esophagus to rule out any intraesophageal lesion. The hypertrophied circular muscle fibers were divided through the thickened portion anteriorly, and the incision was carried to the cardiac end of the stomach, the mucosa being permitted to bulge forth freely. After the operation the patient made an uneventful recovery except for mild cardiac decompensation, which was controlled by digitalis and quinidine. Solid food was taken on the sixth day, and up to the time of writing there has been no further difficulty in swallowing. Roentgenograms taken Jan. 3, 1949, revealed the obstruction to be relieved. Additional films which will be shown later, taken March 11, also revealed no obstruction.

CASE 2.—This case is extremely interesting and was the first of the series. Mrs. K. S., a woman aged 62, had difficulty in swallowing dating back to

March 1945. Roentgenograms taken at this time revealed marked constriction and obstruction in the lower fourth of the esophagus. Dilations were attempted to relieve the difficulty, without success. Biopsy specimens were taken, which showed normal esophageal mucosa. Since no relief was obtained, a gastrostomy was performed in April to permit nutrition. Further dilations were attempted in the rest of the esophagus without success, and the patient was discharged from the hospital, having been fed with a gastrostomy tube. She was readmitted to the West Penn Hospital on November 8 because the gastrostomy tube was not functioning normally and the skin about the abdomen had become markedly macerated and ulcerated. It was assumed at this time that the diagnosis was carcinoma of the esophagus with marked loss of weight and that a change in the gastrostomy tube would afford the patient more comfort. On November 10 a new gastrostomy opening was made, the former one being permitted to heal. After this procedure the patient gained considerable weight, out of all proportion for a patient with carcinoma. Examination of the esophagus, therefore, was again attempted without success, and the patient was sent home with her new gastrostomy site. Roentgenograms of the esophagus still revealed obstruction. By March 1946 the patient had gained considerably and was feeling better, but was willing to accept any surgical procedure that would give her relief. On April 4, after satisfactory preparation, a transthoracic exploration was done through the left side of the chest at the ninth rib. There was no evidence of tumor in the lower end of the esophagus, and the organ was again explored by insertion of a finger through the stomach side. The circular muscle fibers in this case were not hypertrophied as much as in the previous case. A similar procedure was done, dividing the circular muscle fibers from 1½ inches (3.7 cm.) above the diaphragm to the cardiac end of the stomach. The patient made an uneventful recovery and swallowed well from that time. The gastrostomy was closed sixteen days later and has not been necessary since. On two occasions the patient has been admitted for three or four days because of fear that her condition was recurring. However, under reassurance she swallowed with ease, and roentgen examination revealed no appreciable amount of obstruction. The course was favorable until September 1948, at which time the patient was struck by an automobile and sustained an injury to both costal regions. One week later she went into total obstruction as far as the esophagus was concerned. She did not respond to antispasmodics, and she refused instrumental dilations. Operation seemed inevitable. A small incision was made in the upper portion of the abdomen. The stomach was opened and a finger inserted through the cardioesophageal opening. A marked fibrosis had developed which had practically closed it, but by finger dilations the constriction was separated easily and quickly. The patient has had no further difficulty in swallowing.

Case 3.—Mrs. L. I., aged 66, was admitted to the West Penn Hospital Jan. 5, 1947, with the complaint of vomiting and inability to swallow for the past four months. A marked loss of weight had occurred, and the patient had a pronounced and annoying cough. Her general condition was not good. Roentgenograms revealed an obstruction at the lower end of the esophagus, highly suggestive of carcinoma, and the patient's cachectic appearance also suggested it. Esophageal examination was not done in this case because of the patient's refusal. *It had been attempted in the hospital prior to the* present admission. In view of this and after adequate preparation, the patient was operated on four days after admission to the hospital. The left side of the chest was opened through a transthoracic exposure. There was no evidence of carcinoma, and the lumen of the esophagus was patent. The esophagus was dilated. The muscle fibers in the lower fourth again were thickened but did not present a bulbous tumor mass like that which had been present in the first case. Again the circular muscle fibers were divided longitudinally, the mucosa being permitted to bulge through, and the patient made an uneventful recovery. Solid food was taken on the seventh day, and there has been no difficulty in swallowing to date. Roentgen films of the esophagus taken approximately sixteen days after the operation showed some delay in the region of the aortic arch, which is a frequent and well known condition, and only a slight amount of delay affected the stomach. This patient was reexamined roentgenographically on March 11, 1949, and the barium passed with comparative ease. At the time of writing she has no difficulty in swallowing.

Case 4.—Mr. R. M., aged 75, was admitted to the West Penn Hospital Jan. 12, 1947. His chief complaint was that of delay in the passage of food to the stomach, associated with a corresponding weight loss. Roentgenograms that accompanied the patient revealed constriction and obstruction of the lower fourth of the esophagus. Esophagoscopic study revealed no gross evidence of malignant change. There was difficulty in entering the stomach, but with force a bougie was introduced. Although biopsy gave negative results, malignant disease was suspected because of the patient's age, and he was subjected to a transthoracoabdominal exploration through the ninth rib. No evidence of malignant change was found. There was no constriction at the hiatus The muscle fibers were hypertrophied, as in the preceding cases, and the same operative procedure was performed After the operation the patient made an uneventful and reasonably good recovery considering his age He was discharged from the hospital thirty days after the operation He did not return at any time to the hospital for check roentgenograms On March 10, 1949, roentgenograms were taken outside the hospital and showed some degree of delay in emptying, but clinically the patient had no difficulty in swallowing two years and ten months after the operation

SUMMARY

1 Certain general aspects of achalasia are discussed

2 The causative mechanism of achalasia is doubltless neurogenic The pathologic process involves the lower fourth of the esophagus, causing constriction of the circular muscle fibers and is due to degeneration of Auerbach's and the myenteric plexus resulting in loss of coordination of the neural mechanism

3 The condition, in our opinion, is comparable to pyloric stenosis and congenital megacolon

4 All methods of treatment have been taken into consideration Conservative treatment with dilation should be the first choice Esophagogastrostomy has had many good results, however, if the plans outlined in this paper are correct, recurrences are apt to occur from repeated constriction of the circular muscle fibers of the lower fourth of the esophagus Cardioesophageal side to side anastomosis should be effective, because in this procedure the circular muscle fibers are divided in performing the anastomosis but the operation is more hazardous than the method described

5 The transthoracic approach with division of the circular muscle fibers over the lower fourth of the esophagus, permitting the mucosa to bulge, has been performed on 4 patients varying in age from 42 to 75

6 The left transthoracic approach has been adopted because of the ease of operation and because it affords visualization of the esophagus to such an extent that any additional lesion can be recognized By the subdiaphragmatic route with the same plans, it is thought that sufficient division of the circular muscular fibers cannot be accomplished

7 Carcinoma of the esophagus can easily be confused with achalasia

8 Dilatation in the proximal three quarters of the esophagus is not corrected owing to loss of tone from degeneration of the nerve fibers and ganglions, and the peristaltic effect of the esophagus is lost in favor of a gravity mechanism

RÉSUMÉ

1 On discute de certains aspects généraux d'achalasie

2 La cause de l'achalasie est sans doute neurogénique Le processus pathologique atteint le quart inférieur de l'œsophage, provoquant la contraction des fibres du muscle circulaire et ce processus est causé par la dégénérescence du plexus d'Auerbach et du plexus myentérique qui est le résultat du manque de coordination du mécanisme nerveux

3 Cet état, à notre avis, est comparable à une sténose du pylore et à un megacolon congenital

4 Toutes les methodes de traitement ont été prises en considération Le traitement conservateur avec dilation devrait être le premier choisi L'œsophagogastrostomie compte à son actif beaucoup de bons résultats, cependant, si les données contenues dans cet article sont correctes, des rechutes peuvent survenir en raison de la contraction répétée des fibres du muscle circulaire de la quatrième portion de l'œsophage inferieur L'anastomose latérale cardio œsophagienne devrait être efficace parce que les fibres du muscle circulaire sont divisés lorqu'on fait cette anastomose, mais l' opération comporte plus d'aléas que la méthode décrite

5 L'abord transthoracique, en séparant les fibres du muscle circulaire au dessus de la quatrième partie de l'œsophage inférieur, permettant la saillie de la muqueuse, a été réalisé sur quatre malades dont l'âge variait de 42 à 75 ans

6 On avait adopte la voie d'abord transthoracique gauche pour la facilité de l'opération et parce que cette voie permettait une vue directe de l'œsophage d'une étendue telle qu'on pouvait déceler toutes lésions surajoutées Par la voie sousdiaphragmatique avec les mêmes données nous pensons qu'une séparation suffisante des fibres du muscle circulaire ne peut pas être effectuée

7. On peut confondre aisément le carcinome de l'œsophage avec l'achalasie.

8. La dilation dans les trois quarts proximaux de l'œsophage ne peut être corrigée sans provoquer une perte de la tonalitée due à la dégénérescence des fibres et des ganglions nerveux. La fonction péristaltique de l'œsophage est remplacée par un mécanisme de progression due à l'action de la pesanteur.

RESUMEN

1. Se estudian ciertos aspectos de la acalasia.

2. El mecanismo causal de la acalasia indudablemente es neurológico. El proceso patológico afecta el cuarto inferior del esófago, causando una constricción de las fibras musculares circulares, originada por una degeneración de los plexos de Auerbach y mesentéricos, que determinan la pérdida de la coordinación de los mecanismos neurales.

3. El proceso es comparable a la estenosis pilórica y al megacolon congénito.

4. Se han considerado todos los métodos de tratamiento. El tratamiento conservador con dilatación debe ser el preferible. La esofagogastrostomía ha dado muy buenos resultados: pero si las opiniones expresadas en esta comunicación son exactas, es fácil que se presenten recaídas como resultado de la constricción repetida de las fibras musculares circulares del cuarto inferior del esófago. La anastomosis cardioesofágica látero-lateral debe ser efectiva en este caso, ya que en este prodecimiento las fibras musculares circulares quedan seccionadas al realizar la anastomosis, pero la operación es más arriesgada que el método descrito.

5. Se ha utilizado en 4 pacientes cuyas edades variaban de 42 a 75 años la via transtorácica con sección de las fibras musculares circulares sobre el cuarto inferior del esófago, permitiendo la hernia de la mucosa.

6. Se ha adoptado la vía transtorácica izquierda, por la facilidad de la operación y porque proporciona una visualización del esófago de tal grado, que permite reconocer cualquier otra lesión adicional. Se considera que utilizando la vía subdiafragmática con los mismos planos, no puede realizarse una sección suficientemente completa de las fibras musculares circulantes.

7. El carcinoma del esófago puede confundirse fácilmente con la acalasia.

8.- No se corrige la dilatación de los tres cuartos proximales del esófago por la pérdida de tono muscular producida por la degeneración de las fibras y gánglios nerviosos, perdiéndose el efecto propulsor del esófago y actuando en su lugar el mecanismo de la fuerza de gravedad.

RIASSUNTO

1) Considerazioni generali sopra l'acalasia e relativa discussio-ne.

2) Il meccanismo di origine e' indubbiament nervoso. Processi degenerativi del plesso di Auerbach e del plesso mienterico condùcono ad un'incoordinazione del meccanismo nervoso, con una costrizione progressiva delle fibre muscolari ad anello.

3) Si viene in tal modo a creare una condizione paragonabile alla stenosi pilorica od al megacolon congenito.

4) Per quanto riguarda la cura, la preferenza va naturalmente data—all'inizio—alla dilatazione pura e semplice dell'esofago.

L'esofagogastrostomia ha condotto a dei buoni risultati: ma se il meccanismo d'origine dell' acalasia e' quale e' stato ammesso dall'A., e' inevitabile che delle recidive debbano ricorrere per una costrizione ripetuta delle fibre muscolari del quarto inferiore dell'esofago. L'anastomosi laterale cardio-esofagea dovrebbe condurre a migliori risultati, poiche' nell'eseguire l'anastomosi le fibre circolari della muscolatura esofagea vengono interrotte. Ma l'operazione e' piu' pericolosa di quella descritta dall'A.

5) In quattro casi, la cui eta' ha oscillato da 42 a 75 anni, l'A. ha proceduto per via transtoracica alla divisione delle fibre muscolari circolari nel quarto inferiore dell'esofago, in modo da provocare una protrusione della mucosa.

6) Ha preferito la via transtoracica sinistra per la maggiore facilita' di esecuzione e perche' consente una piu' larga esposizione dell'esofago qualora esistano delle lesioni concomitanti. La divisione delle fibre muscolari dell'esofago per via sottodiaframmatica non e' possibile.

7) L'acalasia puo' essere facilmente confusa con un carcinoma.

Fracture of the Spine

New Treatment Without Plaster Casts

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THE modern trend in surgery is to make the patient ambulatory as soon as possible There are distinct limitations to this practice, but generally it has proved to have great advantages over the older practice of prolonged postoperative bed rest

In the October 1937 issue of the *Journal of Bone and Joint Surgery* I described a light hyperextension back brace which I was using successfully in the treatment of fractured spines Many of our patients in Florida are in the geriatric group and cannot well tolerate large plaster casts, especially during the warm months of the year

From 1936 to 1942 I used the aforementioned brace on most of my patients with fractured backs The patient was put to bed in gradually increasing hyperextension on a modified Bradford frame a Herzmark frame or a reversed Gatch bed with the knee elevation coming up under the lower part of the back After a period varying from a few days to a few weeks, when the hyperextension had produced adequate reduction of the compression fracture the patient was taken to the operating room and two plaster hyperextension casts were applied in the usual manner Anesthesia, either general or local was employed but seldom

The first plaster cast was immediately removed and bound together to act as a model for the brace The other cast was then applied and when it was dry the patient was made ambulatory He wore his cast until the brace was ready which usually took about a week After this the cast was removed and the brace worn until healing of the fractured vertebral body was complete The advantages of a 2 pound (0 9 Kg) well ventilated back brace over a much heavier hyperextension plaster cast are obvious

At this point it may be well to point out the difference between a hyperextension brace of the aforementioned type and the ordinary back brace of the two bar or the four-bar variety, called by the names of their originators, Taylor, Knight and others The principle of the hyperextension brace is that of a bow, a seesaw and many similar adaptations in the realm of engineering construction When the patient wearing this brace bends forward or sits down there is no alteration in the hyperextension of the spine, as firm metal fixation holds the symphysis, the sternum and the lumbar portion of the spine in their normal interrelations

The principle of the Taylor brace is exactly the reverse There is only one supposedly fixed point, the pelvic girdle, the rest of the spine has to be supported from this one area by the posterior metal bars No matter how well such a brace is applied, when a patient bends forward the dorsal part of the spine will almost invariably pull away from the top of the brace Also, the burden of support for the upper part of the spine generally is borne by shoulder straps or pectoral pads, the anchorage again being transmitted down to the pelvic girdle Every surgeon is aware of the difficulties of hyperextending a spine adequately with this type of brace Personally, I do not think it can be done, and I have never seen one applied that could satisfactorily maintain the marked hyperextension that is mandatory in many cases of fractured spine Another point in favor of the hyperextension brace is that no perineal straps are needed

Soon after coming out of the Naval Reserve Service in January 1946 I had an elderly patient, a woman, with a fracture of the second lumbar vertebral body I treated her as I have described obtaining the desired hyperexten

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Read at the Thirteenth Annual Assembly of the United States Chapter International College of Surgeons St Louis November 1948

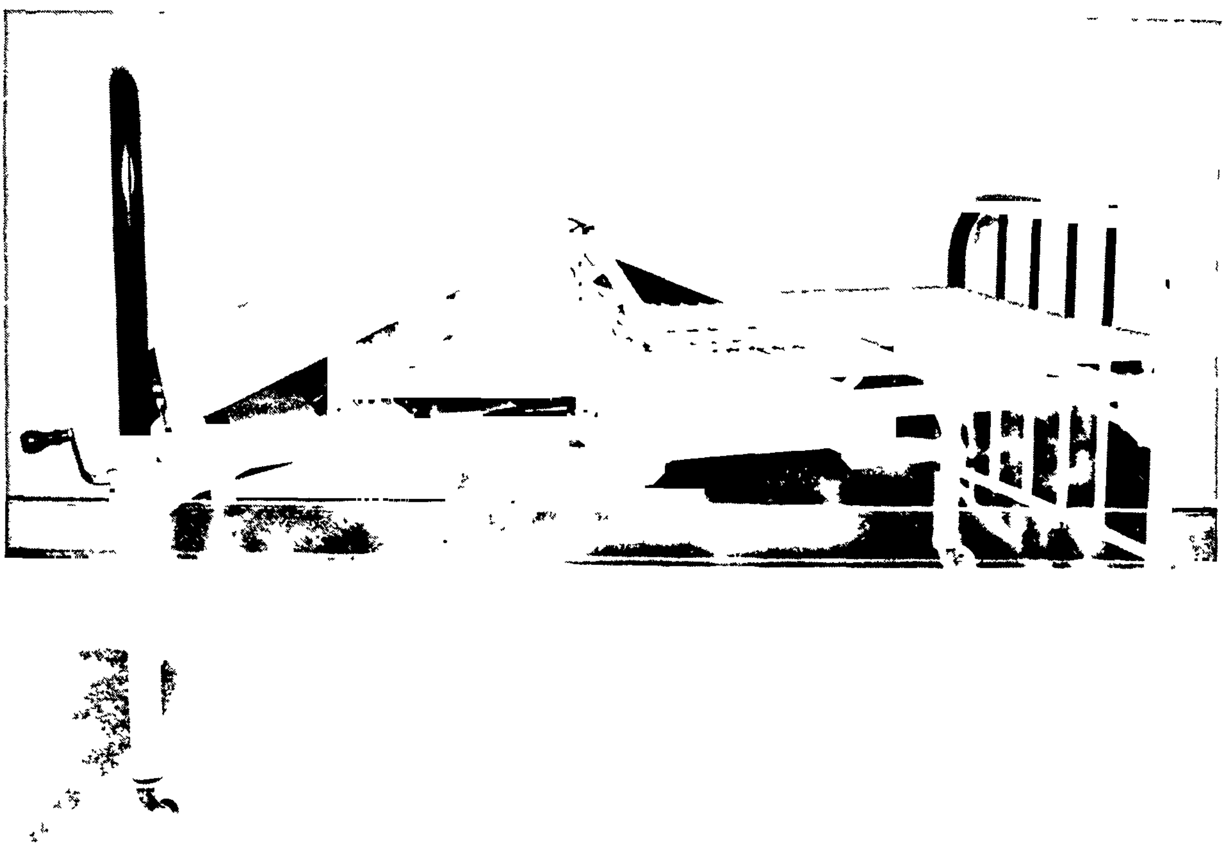

Fig. 1.—Ordinary hospital bed with maximum elevation of 12 inches (30.4 cm.) from bed level.

sion with the reversed Gatch bed, but she had a very rough time in the operating room when I was putting on those two casts. In addition to the fact that she was obese, her cardiac status for several years had been precarious. The next day, while walking about her room, she had a cardiac accident and was put to bed by her cardiologist. She died about five days later without becoming ambulatory again. In reviewing this case I decided there must be a way of eliminating the stress and strain involved in taking the patient into the operating room and of applying these plaster casts with the patient on a hyperextension frame, a sling or some similar apparatus.

Since that time, all of my patients with fractured spine requiring hyperextension have been placed with their heads toward the foot of an ordinary hospital bed. Adequate reduction can be obtained in almost every instance by gradually raising the Gatch bed under the lumbar portion of the spine. More elevation can be obtained by placing boards across the bed; if they are fastened together at the top of the Gatch part, an acute angle can be obtained. Adequate hyperextension even of the lower part of the dorsal area can be procured without putting the apex of the angle directly under this region.

In order to prevent the patient from sliding either downward or upward, low shock blocks at either end of the bed are often needed. Of course, the usual precautions must be taken to make sure that the patient will not raise his shoulders or his buttocks from the bed. A small pillow under the head or pillows under the knees may be permitted, and, of course, the patient can turn from side to side with hyperextension still adequately maintained.

It is not within the scope of this article to discuss the medical care of the patient, which is an established routine familiar to all.

As soon as the patient is put to bed he is measured for a hyperextension back brace. With our brace men, Mr. Dan Blair of Atlanta and Mr. Robert Blair of Orlando, a plan was

Data on 58 Consecutive Cases of Compression Fracture of Spine

Patient	Sex	Age	Occupation	Cause	Date of injury	Area	Seen after trauma	Time on Gatch bed	Full time in brace	Part time in brace	Follow up after trauma	Result
S C	M	39	Linesman	Fall	1 16 46	D 9	1 hr	7 da	12 mo	12 mo	32 mo	Good
R W	F	18	Office	Auto	1-30-46	L-1 2	1 hr	3 mo fr pel	5 mo	3 mo	31 mo	Excellent
E W	F	18	School	Auto	3 6 46	L-1 2-3	2 wk	4 da	7 mo	1 mo	29 mo	Excellent
R W	M	47	Salesman	Fall	3 14-46	L-1	3 hr	5 da	6 mo	1 mo	29 mo	Excellent
A R	F	16	School	Fall	6-14-46	D 6-7-8	7 da	5 da	9 mo	3 mo	26 mo	Excellent
O L	M	38	Flier	Plane	6-29-46	D 12	2 wk	6 da	6 mo	2 mo	26 mo	Excellent
E C	F	19	School	Diving	6 29 46	D 11	2 wk	7 da	6 mo	2 wk	26 mo	Excellent
O S	F	76	Housewife	Fall	8 2-46	L-2	1 hr	5 da	7 mo	3 mo	24 mo	Excellent
M K	F	68	Housewife	Fall	9 2-46	L-1	6 wk	6 da	6½ mo	0	23 mo	Excellent
W R	M	46	Flier	Plane	10-15 46	D 12	2 mo	0	8 mo	4 mo	22 mo	Good
E C	F	46	Saleswoman	Fall	12 3-46	D-8	2 hr	3 wk	6½ mo	2 mo	20 mo	Good
J I	M	77	Retired	Fall	12 3-46	D 12 L-1	3 hr	2 wk	7 mo	5 mo	20 mo	Excellent
E M	F	76	Housewife	Fall	12 17-46	L-1	3 da	5 mo tumor	26 mo	0	19 mo	Good
J I	M	32	Flier	Plane	12 23-46	L-5	1 da	10 da	6 mo	2 mo	19 mo	Excellent
M M	F	63	Housewife	Fall	1 10-47	L-2	4 da	2 wk	6 mo	2 mo	19 mo	Excellent
M F	F	63	Housewife	Fall	1 14-47	L-2	4 hr	1 wk	5 mo	1 mo	19 mo	Excellent
E A	M	17	School	Fall	2 9 47	L-2	8 hr	4 da	5 mo	1 mo	18 mo	Excellent
C Y	M	18	School	Motorcycle	2 11-47	D 11 12	2 hr	4 mo fr fem	3 mo	2 mo	18 mo	Excellent
W K	M	53	Electrician	Fall	3 21-47	D 12	2½ wk	6 da	6 mo	3 mo	17 mo	Good
J W	M	49	Business	Fall	4- 6-47	L-3	0	5 wk	7 mo	0	17 mo	Excellent
W J	F	56	Housewife	Fall	4 21-47	D 12	10 da	10 da	5½ mo	2 mo	15 mo	Excellent
M S	F	55	Housewife	Fall	5-14-47	L-1 2	1 hr	4 da	6 mo	1 mo	15 mo	Excellent
N H	M	27	Builder	Diving	6- 8 47	D 1-4	1 hr	8 da	5 mo	0	14 mo	Excellent
J F	F	65	Housewife	Fall	6-10-47	D 11 L-1	1 mo	4 da	9 mo	0	14 mo	Good
N S	F	70	Housewife	Fall	6-25-47	D 11	1 da	7 da	6 mo	2 mo	14 mo	Excellent
B D	F	53	Housewife	Fall	7 10-47	D 11	3 mo		4 mo		13 mo	Excellent
I C	F	30	Housewife	Fall	7 15-47	D 12	4 hr	30 da	7 mo	0	13 mo	Excellent
B W	M	44	Laborer	Fall	7 24 47	L-3	1 da	2 mo	3 mo	0	Spinal Fusion	Too early
D C	F	35	Housewife	Auto	8 7-47	D 7	2 wk	1 wk	5 mo	2 mo	12 mo	Lost track
S A	F	64	Housewife	Auto	8 11-47	D 11 12	2 hr	6 wk	4 mo	1 mo	12 mo	Excellent
W C	M	37	Linesman	Fall	8 17-47	L-1	1 da	10 da	5 mo	1 mo	12 mo	Excellent
J P	M	61	Laborer	Fall	9 1-47	D 9	1 wk	5 da	4 mo	2 mo	12 mo	Good
K M	F	63	Housewife	Auto	9 29-47	D 12	3 mo		4 mo	3 mo	12 mo	Poor
R H	F	15	School	Fall	10-12-47	L-1 2	1 mo		5 mo	0	10 mo	Excellent
K P	F	24	Office	Auto	10-24-47	D 9 L-1	5 da	2 wk	5 mo	2 mo	10 mo	Excellent
P H	F	19	Housewife	Auto	10-24-47	D 11 12	2 wk	4 da	5 mo	1 mo	10 mo	Excellent
C B	M	59	Laborer	Fall	11 1-47	D 12	6 wk	1 wk	6 mo	3 mo	9 mo	Too early
C P	M	60	Carpenter	Fall	11 13-47	L-1	2 hr	8 da	5 mo	3 mo	9 mo	Too early
R W	M	42	Carpenter	Fall	11 28-47	D 11 L-1	1 da	3 mo	6 mo	1 mo	10 mo	Excellent
F R	F	65	Housewife	Fall	12 3-47	D-8	1 wk.	8 da	4 mo	4 mo	9 mo	Too early
F E	F	84	Housewife	Fall	12 9 47	L-1	1 da	3 da	6 mo	3 mo	9 mo	Too early
M F	F	65	Housewife	Fall	12 10-47	D 12 L-2-3-4	2½ mo	1 mo	6 mo	1 mo	9 mo	Good
I B	M	52	Business	Spontaneous collapse	12 23-47	D 12	3 wk	10 da	4 mo		4 mo	Lost track of (carcinoma metastasized to heart)
S R	F	85	Housewife	Fall	1 6-48	L-2	1 da	5 da	2 da		Died	Heart
A J	F	65	Housewife	Fall	1 6-48	D 12	1 wk.	6 da	6 mo	1 mo	8 mo	Too early
F I	F	81	Housewife	Fall	1 9-48	D-6	4 hr	6 da	4 mo	4 mo	8 mo	Too early
L S	F	75	Housewife	Fall	1 11-48	D 12	3 da	5 da	5 mo	2 mo	8 mo	Too early
M B	F	81	Housewife	Fall	1 11-48	D 11 12	1 wk.	4 da	8 mo		8 mo	Too early
F A	F	35	Office Work	Auto	3 15-48	D 9	16 hr	1 wk	5 mo	2 mo	7 mo	Too early
N M	M	49	Carpenter	Fall	3 1-48	L-1	6 wk	1½ wk			Died	Heart
R A	F	44	Housewife	Auto	3 24-48	D 7	2 hr	5 da	5 mo	5 mo	5 mo.	Too early
J T	M	39	Mechanic	Motorcycle	3 14-48	L-1	10 da	4 mo			4 mo	Too early
S D	F	7	Schoolgirl	Fall	4 9-48	D-8	½ hr	3 da.	4 mo	2 wk	4½ mo	Too early
E.B	F	52	Housewife	Spontaneous collapse	3 19-48	D-12	2 mo	2 wk	5 mo		5 mo	Comfortable in brace
L. G	F	37	Housewife	Auto	5-29-48	L-2	1 da	6 da.	3 mo		3 mo	Too early
I J	M	34	Laborer	Auto	5-30-48	D-8	1 yr	0	3 mo		15 mo	Comfortable in brace—needs fusion
B R	F	62	Housewife	Auto	6- 5-48	L-1	2 mo	0	1 mo		3 mo	Too early
C D	M	26	Laborer	Fall	6-21-48	D 12 L-1	4 hr	2 wk.	2 mo		2½ mo	Too early

developed by which a hyperextension back brace of Dow metal could be made from measurements taken with the patient on the hyperextension bed. By the time complete restoration of the normal alignment of the spine and reduction of the compression fracture have been obtained (from a few days to two weeks) a brace is usually ready to be put on. It has entailed a great deal of trial and error to work out a system of making a well fitting brace from measurements alone, without the use of a plaster model. However, the process has now been brought to a satisfactory standard, although, of course, most of the braces have to be slightly altered when the patients become ambulatory. The same, however, applies to braces modeled from plaster casts.

From the start I have realized that the entire framework of the brace must be of light metal, with no leather or similar straps to attempt maintenance of the body in hyperextension. The sternal plate must be well padded and must at all times rest as high on the sternum as possible without extending above the upper border of the manubrium. The lower anterior pad or plate should lie on the symphysis pubis and must be made so that it does not cut into the groin when the patient sits down. The back support was formerly made of a single piece of metal, but now I use a plastic pad with two metallic bands 1 inch (2.5 cm.) in width running through it. These bands are securely fastened to both side bars of the brace, one side being anchored with screws or bolts and the other having adjustable screw devices. After being fitted correctly, these threaded locking connections are so secured that the patient cannot loosen the bands himself. In rare instances, with complete supervision at home, the patient may be allowed to sleep without his brace on a hyperextension bed similar to the one he had in the hospital. However, the brace must be removed and replaced only while the patient is in bed and in hyperextension.

Crutches, with or without a pelvic band, are added when the fracture is of a type to preclude any lateral movement. Patients with

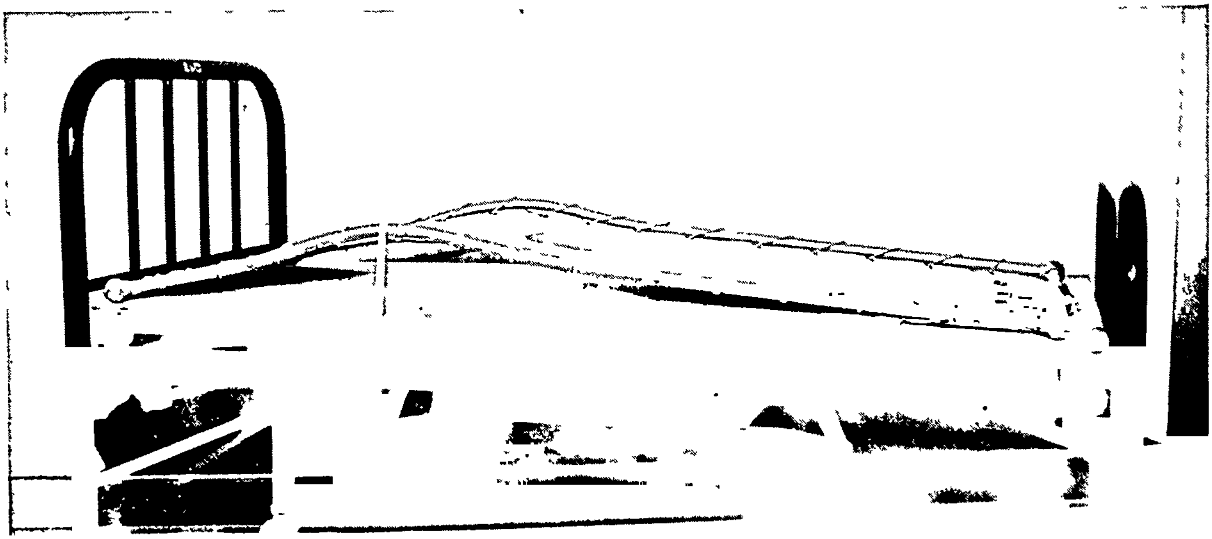

Fig. 2.—Hospital bed with Bradford frame. Maximum elevation of 6 inches (15.2 cm.) from bed level.

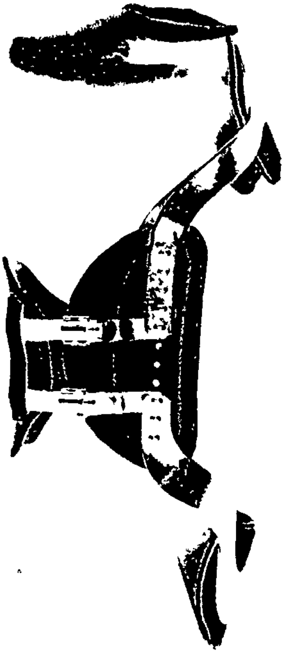

Fig. 3.—Side view of hyperextension brace.

fractures of the upper dorsal portion of the spine must have cervical extension put on this brace with the neck held in hyperextension.

Figures 1 and 2 show the ordinary Gatch hospital bed and the Bradford frame, Figures 3 and 4, the hyperextension brace. The roentgenograms in Figures 5 and 6 indicate the results obtained by use of this brace in 2 cases. The table is a synopsis of data on my 58 patients treated by this method without the use of plaster casts from June 16, 1946 through June 5 1948. The oldest patient was an 85 year old woman and the youngest a 7-year old girl.

This is a consecutive list. Since it was compiled I have had 29 more patients associates, Dr Newton C McCollough and Dr Royston Miller, have had 20 more patients during the past year and a half. This makes a total number of 88 patients treated since January 1946. Forty eight of these were treated before the war, so that 136 have been treated with the hyperextension back brace since 1936, 88 of whom have had no plaster of paris casts.

This type of brace has been highly successful for other patients suffering from pain in the back due to spinal osteoporosis with or without collapse of a vertebral body, and also for young persons with Scheuermann's adolescent osteoporosis. In fact, for any dorsal condition in which hyperextension or rigid immobilization is desired this type of brace will be found adequate.

ANALYSIS OF CASES

There were 22 male patients aged from 17 to 77 (average age, 40.6 years) and 36 female patients aged from 7 to 85 (average age, 51.4 years). The number of average days in bed in

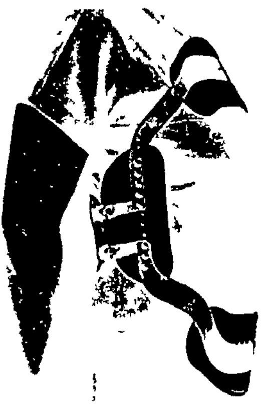

Fig. 4.—Side view of hyperextension brace as worn by patient.

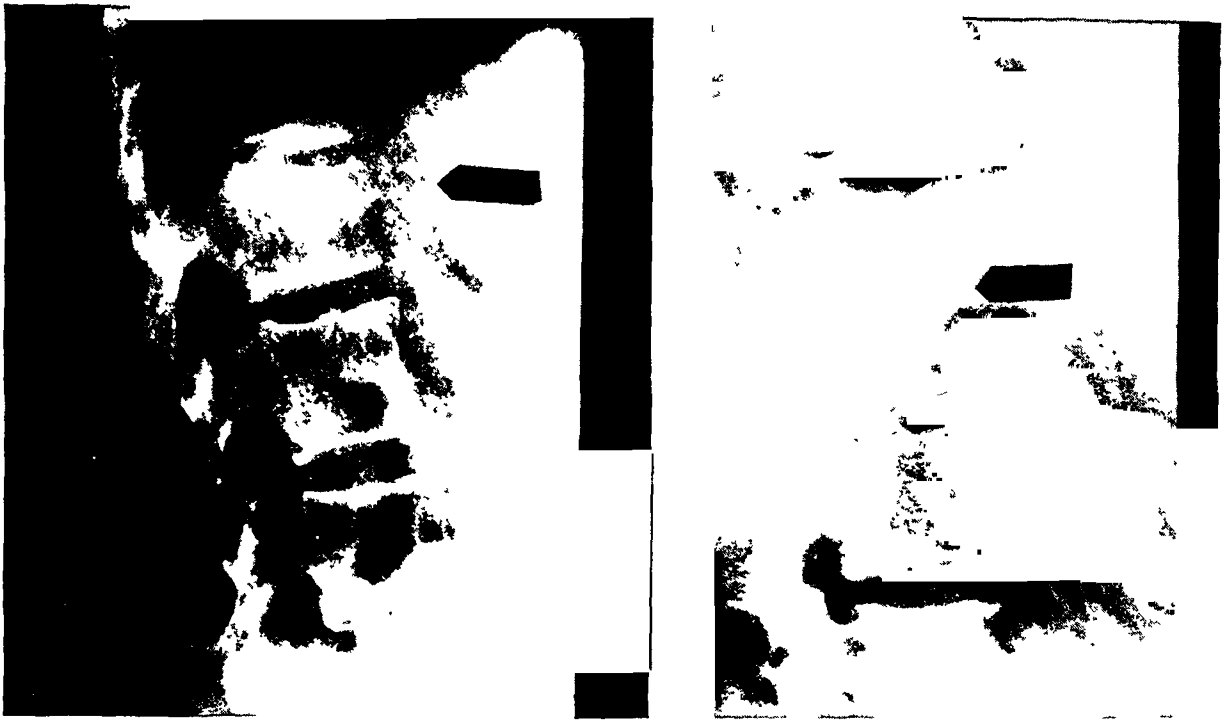

Fig. 5.—Fracture of first lumbar vertebra. *Left,* at time of injury; *right,* six months later.

48 uncomplicated cases was 7.3. The average full time spent in the brace was three and seven-tenths months; the average part time, one and seven-tenths months. There were 2 deaths within two months after injury. There were 8 cases in which fractured spines were complicated with other conditions, necessitating a longer time in bed.

SUMMARY

A method is presented for treating compression fractures of the lower dorsal and lumbar portions of the spine without the use of plaster casts or hyperextension other than on a reversed Gatch bed. Neither general nor local anesthesia is employed, and the patient is usually ambulatory within a week or two after trauma. On the whole, the results have been excellent.

RÉSUMÉ

On présente une méthode de traitment des fractures par compression dé la dernière portion des vertèbras dorsales et des vetèbres lombaires de la colonne vetébrale sans employer d'appareil plâtré ou d'hyperextension autrement que par un lit soulevé de Gatch. On n'employa ni anesthésie locale, ni générale, et le malade marche habituellement au bout d'une semaine ou deux après l'accident. En bref, les résultats ont été excellents.

RESUMEN

Se presenta un método para tratar las fracturas por compresión de las partes dorsal inferior y lumbar de la columna vertebral sin emplear enyesados ni hiperextension, excepto la usada en un lecho invertido de Gatch. No se emplea anestesia general ni local y el paciente queda ambulatorio en general dentro del plazo de una semana o dos después del traumatismo. En conjunto los resultados han sido excelentes.

RIASSUNTO

Espone un metodo di cura per le fratture da compressione della porzione più bassa della colonna dorsale e della colonna sacrale, che non richiede nè ingessatura, nè iperestensione, nè anestesia locale o generale, ma solo una modificazione del letto di Gatch.

Gli ammalati possono già carrina re 1-2 settimane dopo il trauma; i risultati sono stati—nel complesso—ottimi.

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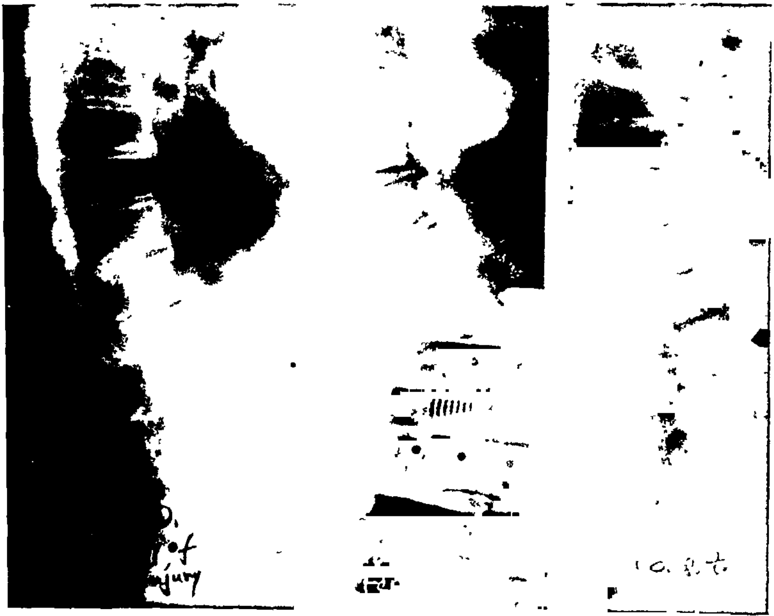

Fig 6—*Left*, roentgenogram taken on day of injury. *Center*, appearance one month later. *Right*, film taken three months after injury.

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Some Opinions on Science

Science is simply common sense at its best—that is, rigidly accurate in observation and merciless to fallacy in logic.—*Huxley.*

Science is a first-rate piece of furniture for a man's upper chamber. if he has common sense on the ground floor.—*Holmes.*

Science keeps down the weed of superstition not by logic, but by rendering the mental soil unfit for its cultivation.—*Tyndall.*

Every great advance in science has issued from a new audacity of imagination. —*Dewey.*

Corneal Incision for Cataract

Authors' Technic

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AMONG American ophthalmologists it is generally conceded that deep corneal or corneoscleral sutures offer certain definite advantages over more superficial sutures in the closure of cataract incisions. Most surgeons agree that such deeply placed sutures (*a*) reduce the incidence of wound separation, iris and/or vitreous prolapse, (*b*) decrease the amount of corneal astigmatism, (*c*) permit earlier ambulation, and (*d*) aid in the prevention of epithelial downgrowth. There is much evidence that hyphema is also reduced but there is some controversy over this point. The disadvantages of deep sutures are that (*1*) the operation is rendered more complicated, (*2*) removal of these sutures is attended with some hazard, and (*3*) irritation and discomfort are caused by a suture if any portion of it encroaches upon the cornea.

Although our own experience confirmed the advantages of deep corneoscleral sutures, we felt that the incidence of hyphema was too high. In an effort to reduce the incidence of postoperative bleeding, the logical procedure is to consider the source of such bleeding. Vail[1] and others have shown rather conclusively that such bleeding arises from newly formed vessels bridging the wound. It would seem then that one may expect to encounter such vessels most frequently in the sclera or the limbus and less frequently in clear cornea.

In making a corneal incision three approaches are possible. One may dissect down a conjunctival flap, split the cornea and make the incision in the cornea. Such an incision interrupts nearly as many vessels as does an incision directly at the limbus or the corneoscleral junction. An alternative would be to omit the conjunctival flap, begin the incision in the sclera or the limbus and enter the anterior chamber via the cornea. Here again many vessels are interrupted. The only way to avoid these vessels completely is to omit the conjunctival flap and make the incision directly in clear cornea.

The disadvantages of a pure corneal incision would seem to be as follows: (*a*) corneal astigmatism might be greater because of the flaccidity and reduced resilience of the cornea; (*b*) keratitis would seem to increase because the avascular cornea has poorer opportunity for repair; (*c*) infections could be increased where the wound was not covered by conjunctiva; (*d*) prolapse of the iris would be invited and, when it did occur, would be more dangerous and more difficult to repair; (*e*) epithelial downgrowth would probably be more frequent.

In the past decade many types of preplaced corneal and corneoscleral sutures with and without conjunctival flaps have been described. These have recently been reviewed by Bell.[2] Most so-called corneal incisions are actually limbal incisions. To our knowledge no one in recent years has presented a series of cases with preplaced sutures in clear cornea. The technic herein described has been utilized in 300 consecutive cases. Statistical data with comparative figures for other procedures are submitted showing the relative attributes of each.

TECHNIC

Preoperatively homatropine (5 per cent) and paredrine (1 per cent) are instilled. Pontocaine (1 per cent) is used for topical anesthesia. A modified Van Lint infiltration is preferred for akinesia. The lashes of the upper lid are trimmed, and warmed bichloride of mercury ointment (1:3000) is injected into the inferior lacrimal canaliculus. Horner's lid sutures[3] are inserted in the upper and lower lids and a bridle suture is placed under the superior rectus muscle. Retrobulbar injection of novocaine (with epinephrine 3 minims to the ounce) is routine.

Fixation is accomplished with an Elschnig

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forceps at 6 o'clock. A Bard-Parker knife (blade No. 15) is used to make a partial incision in the cornea concentric with the limbus from 9:30 to 2:30 o'clock (Fig. 1*A*). The ideal location is at the terminal loops of the limbal vessels. The incision penetrates to about one-third the thickness of the cornea. It is important to keep the heel of the blade elevated so that redundant conjunctiva does not get beneath it.

Five corneal sutures are placed, one each at 10, 11, 12, 1 and 2 o'clock (Fig. 1*B*). Atraumatic 000000 black silk sutures (Davis and Geck C-301) are inserted in the lips of the wound, the needles passing from the sclera toward the center of the cornea. These tracts should be tangential with the cornea. The sutures need be only deep enough and wide enough to make firm closure. A bite on either side of the wound 0.5 mm. wide and 0.2 mm. deep is ideal. The suture should not be placed deeper than the depth of the incision.

With a sharpened punctum dilator the sutures are picked up in the prepared slotted wound and looped aside (Fig. 2*A*). The speculum is now removed. A keratome incision is made at 12 o'clock and continues into the anterior chamber until the incision extends up to the sutures at 11 and 1 o'clock (Fig. 2*B*). The assistant grasps the looped suture on each side, causing the preplaced slotted wound to gape slightly as the incision is made. After the keratome enters the anterior chamber, the assistant releases the hold on the sutures.

The incision is enlarged to 3 and 9 o'clock with Westcott scissors (Fig. 3*A*). The surgeon grasps the loop of the suture closest to him, and the assistant holds the anterior suture. These sutures should be grasped as close to the wound as possible. Only enough traction should be used to make the wound gape slightly.

An iridotomy is made at approximately 12 o'clock (Fig. 3*B*). This is done with the Barraquer butterfly iris scissors. If the pupil is widely dilated and most of the iris is under the corneal lip, a forceps is used to drag the iris toward the center of the pupil. The iris is never actually grasped with a forceps unless an iridectomy is to be done.

The Arruga forceps is preferred except when the lens is intumescent, in which case the Barraquer erisphake is used. With the former, the lens capsule is grasped at the 6 o'clock position, the forceps passing beneath the iris (Fig. 4*A*). Traction is placed on the capsule, and counter massage is affected with a muscle hook, the foot and sole of the hook, not the toe or the heel, being utilized. The counter massage is placed just inside the corneo-

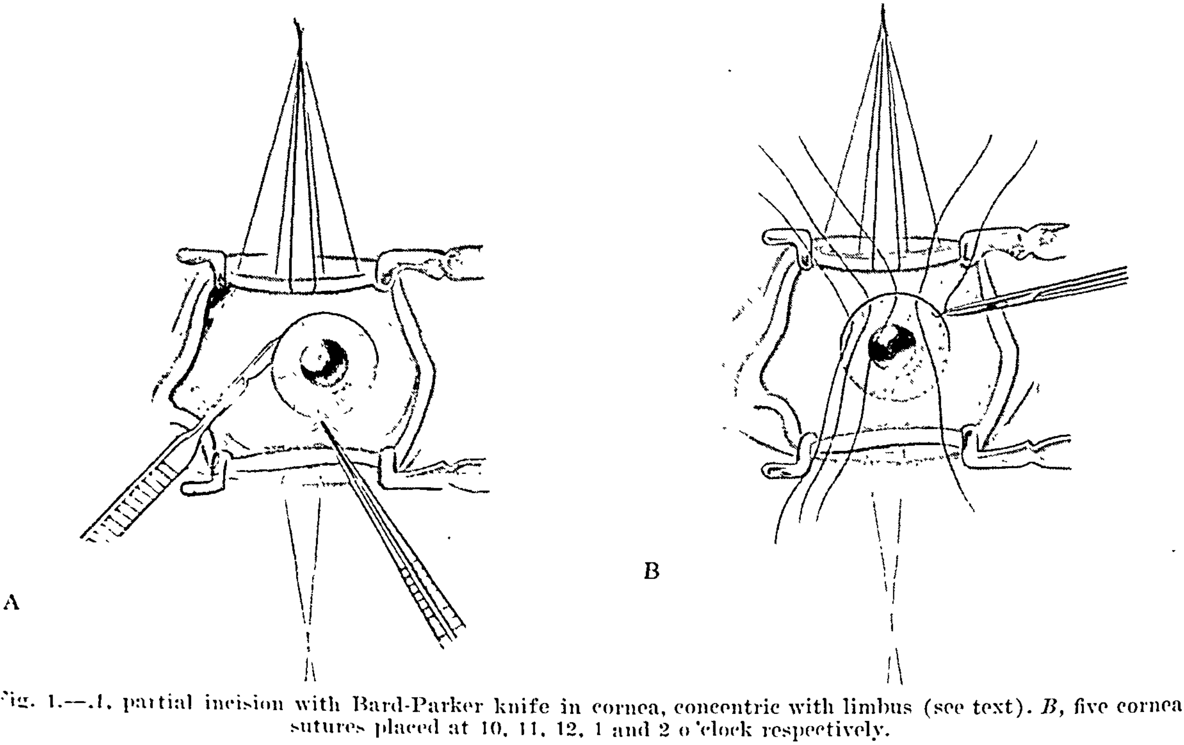

Fig. 1.—*A*, partial incision with Bard-Parker knife in cornea, concentric with limbus (see text). *B*, five corneal sutures placed at 10, 11, 12, 1 and 2 o'clock respectively.

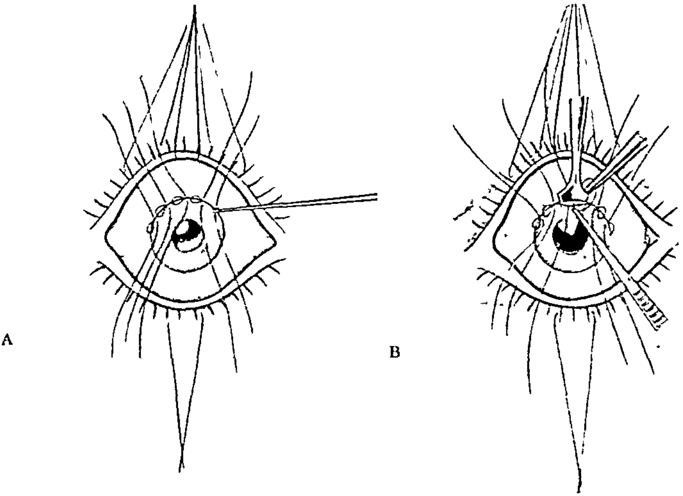

Fig 2.—*A*, sutures picked up and looped aside (see text). *B*, keratome incision made at 12 o'clock continues into anterior chamber until incision extends up to sutures at 11 and 1 o'clock

scleral junction Pressure against the vitreous is avoided, and the procedure is one of stripping the zonule through the cornea Only enough tension is placed on the capsule to make it taut.

No wheel-like torsion or rocking of the forceps is used When the zonule ruptures, the massage is continued around the limbus until the equator enters the anterior chamber, when it is tumbled.

The sutures are tied with simple square knots, the suture at 12 o'clock being tied first and the sutures at 10 and 2 o'clock last (Fig 4*B*). Air is injected into the anterior chamber. One per cent pilocarpine and sulfathiazole ointment are instilled in the conjunctival sac. The suture in the lower lid is removed The suture in the upper lid is pulled through at each end and used to close the lids by means of Scotch tape over the cheek. Only the eye operated upon is patched and shielded, the other eye remaining uncovered

During the first twenty-four hours the patient is permitted to sit on the edge of the bed. At the end of this time the dressing is changed and the eye inspected. Atropine (1 per cent) is instilled At this time the patient is permitted out of bed and may walk around the room. Daily dressings follow. Sutures are removed on the tenth to the thirteenth day, depending upon the cooperation of the patient.

COMMENT ON TECHNIC

Pontocaine is preferred to cocaine; anesthesia is adequate, and there is less drying of the cornea. There is also less likelihood of local or general toxic reaction. Bichloride of mercury is injected into the canaliculus to thwart the growth of any organisms lying dormant in the lacrimal sac

A modified Van Lint[5] injection is preferred to the O'Brien[6] akinesia For reasons not totally clear to us, use of the latter is [illegible] ally followed by some anxiety [illegible] The injection is made directly [illegible] the orbit, extending to the [illegible] brow above and the base of [illegible] nose below The injection should [illegible] of the periosteum. Such [illegible] akinesia and do not [illegible] swelling of the lids [illegible] the upper and lower lid near the free margin of the lid because of the placement of lid sutures.

For retrobulbar injection we prefer 2 per cent novocaine with 3 minims of epinephrine (1:1,000) to the ounce. More epinephrine than this causes too great hypotony. About 1.5 cc. is injected.

Homatropine is adequate to dilate the pupil in most cases. A widely dilated pupil is desirable in grasping the lens, but it is not absolutely necessary when the lens is to be grasped at the 6 o'clock position. Koke[7] has hypothesized that, since sympathetic stimulants widen the zone between the lens equator and the ciliary processes and produce added recession of the anterior vitreous, this principle could be used to advantage in the surgical treatment of cataract. He instilled 2 per cent scopolamine and 10 per cent neosynephrine. Homatropine and paredrine are a much weaker combination but pay tribute to this contention. We prefer the weaker cycloplegics and mydriatics in order that miotics may be used to better advantage at the conclusion of the operation.

In our opinion there is no question about the advantages of preplaced sutures. In the first place, much of the operation is completed before the anterior chamber is opened. The shorter the time the intraocular tissues are exposed to the outside world, the less the danger of infection or unfavorable tissue reaction. Second, there can be no doubt that approximation of the lips of the wound can be more exact when the sutures are placed before the incision is completed. Finally, there is less trauma in placing the sutures before the incision is made, because there is less distortion of the lips of the wound and the lips need not be grasped with a forceps.

There may be some argument that five sutures make a difficult field in which to work. Without able assistance this would certainly be true. However, with four hands, the sutures can be manipulated easily, so that they are no more troublesome than one or two sutures. Needless to say, it would be very difficult to cut between five sutures if the Graefe cataract knife were used. With the keratome and scissors, however, the sutures are not troublesome

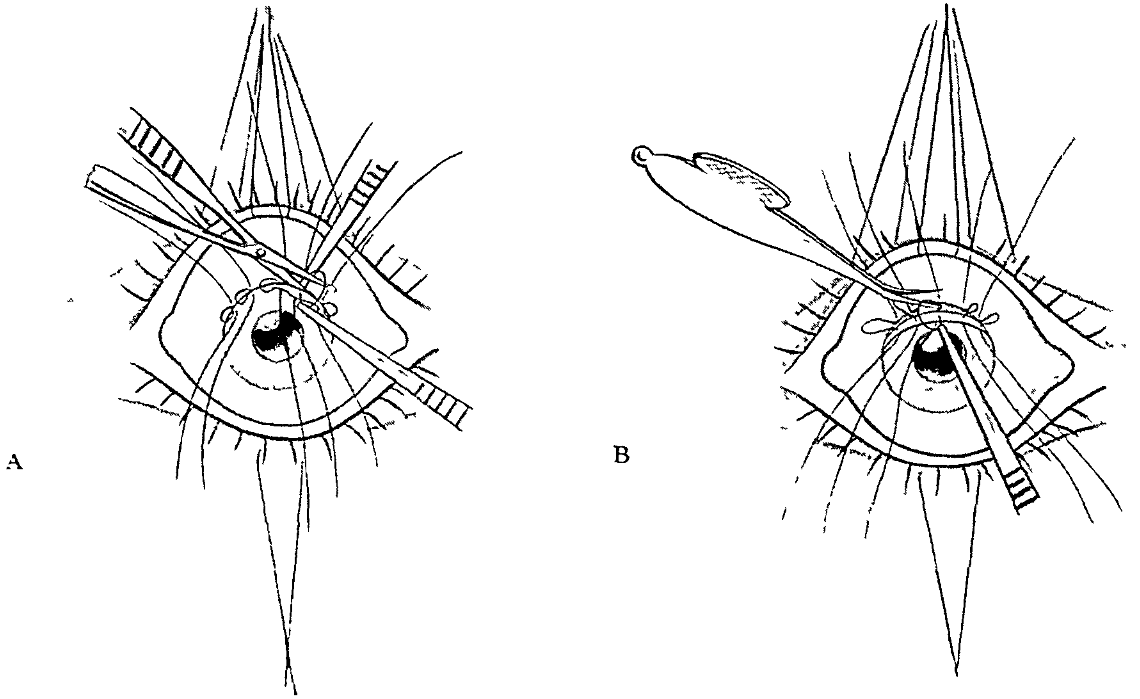

Fig. 3 —*A*, incision enlarged to 3 and 9 o'clock with Westcott scissors *B*, iridotomy made at approximately 12 o'clock

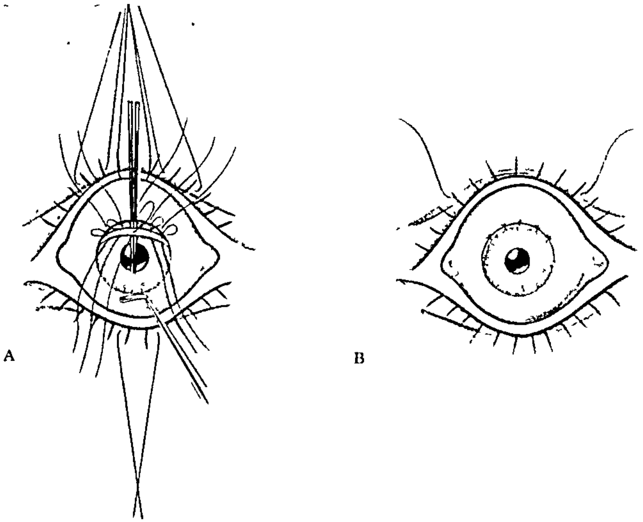

Fig 4 —*A*, lens capsule grasped at 6 o'clock position, with forceps passing beneath iris (see text) *B*, sutures tied with square knots, the suture at 12 o'clock being tied first and those at 10 and 2 o'clock last.

and actually aid in guiding the direction of the incision. This number of sutures is justified because of the reduced incidence of prolapse of the iris and because the cornea is more readily fitted into its original position.

Some type of gutter must be made before the suture is placed. In pointing out the merits of an ideal suture, McLean[8] stated that such a suture should not go over the lips of the wound, because of the danger of inversion of the edges. A modified Lunsgaard knife is adequate for such a slot, but we find a Bard-Parker blade No 15 easier to handle. Because the incision is made in one sweep, a new blade is used each time in order to have consistently sharp blades. The incision is made either in clear cornea or at the point where the terminal loops of the limbal vessels are encountered In the latter case there is just enough bleeding to make the wound visible. In this location it is much easier to place the sutures exactly as desired, as there is corneal tissue on either side of the wound. When one lip is covered with conjunctiva, the latter not only slides back and forth over the wound but partially obscures the underlying tissue.

Too deep a wound is prone to cause splitting of the corneal lamellae when the sutures are placed. Repeated incisions unnecessarily traumatize the cornea and tend to make the slot wider and more irregular. In this series of cases the incision was made perpendicular to the surface of the cornea Recently the incision has been made obliquely, and in our opinion this promotes firmer union.

The speculum is removed before the keratome incision is made. We see no reason to disable a perfectly good assistant by having him elevate the speculum when sutures hold the lids apart adequately. The speculum is used prior to the incision, as it helps to hold the globe more rigidly and this facilitates placement of the sutures

Unless the globe is deeply set in the orbit, a large keratome is preferred. The incision is made as close to the posterior lip of the wound as possible. If this is done, the incision more closely follows the line of the original slotted incision.

The Westcott scissors is an ideal instrument for completing the corneal incision. Either hand may be used, whether the surgeon is ambidextrous or not. The outer blade should lie nearly flat against the sclera; otherwise, the incision is too nearly perpendicular to the surface of the cornea, and this invites prolapse of the iris. The broader the two opposing surfaces, the better is the healing.

A good iridotomy is of equal value to a peripheral or a complete iridectomy. We agree with Hilding[9] that the reason for the iridectomy or iridotomy is to furnish communication between the posterior and the anterior chamber. Such communication not only prevents prolapse of the iris but discourages a shallow chamber. After the chamber is re-formed but before normal intraocular pressure occurs, there may be a tendency for the hyaloid to plaster itself so intimately to the posterior surface of the iris that the aqueous cannot pass through the pupil. If there is no other communication between the anterior and posterior chambers, the iris diaphragm is pushed forward, creating a shallow chamber or even prolapse. In the former case, it matters little where the iridotomy is. In preventing prolapse of the iris as Hilding[10] has so beautifully illustrated, the place for the iridotomy is adjacent to the incision. Hilding further demonstrated that an iridotomy is needed least where the suture lies. With our closure, however, prolapse of the iris has been such a minor problem that we place the iridotomy at or near 12 o'clock. One iridotomy is as good as several, so long as it functions. If it becomes filled with exudate or pigment or is rendered ineffective by adherent vitreous, it does not function. In this series only 1 iridotomy was performed. At present we are performing 2 iridotomies, 1 each at 11:30 and 12:30 o'clock.

For delivery of the lens, the Arruga forceps is preferred unless the lens is intumescent and/or hypermature, when the Barraquer technic is used. In using the Arruga forceps, there are many methods available. Kirby[11] grasps the upper portion of the capsule because it is easier to visualize and there is no backward pressure against the lens. Our preference is for the tumbling method of Knapp,[12] with some modification. The capsule is grasped at the 6 o'clock position, the forceps passing below the iris. The capsule is lifted toward the center of the cornea to put traction on the zonule. Simultaneously a stripping motion is made with the flat foot of a muscle hook just inside the corneoscleral junction. This strips the zonule in much the same manner as one would dissect a tonsil from the upper pole of its fossa. Initially, no other motion of the forceps is used, as we consider it unnecessary and likely to rupture the capsule. After the lower equator is subluxated, the stripping of the zonule is continued on either side until the lens appears in the wound. Then a wheel-like rotation of the lens is permitted until the upper portion of the zonule is stripped. We see no advantage in releasing the hold on the capsule when the lens is dislocated unless the capsule tears. Should this occur, the capsule is grasped elsewhere at the equator with the Verhoeff forceps and the lens delivered as one would empty an open sack of water.

The importance of exerting the so-called counterpressure against the zonule rather than against the vitreous cannot be overemphasized. Loss of vitreous should occur only when there are adhesions between the capsule and hyaloid or when the hyaloid membrane has degenerated. Even a fluid vitreous need not be lost if the hyaloid membrane is intact. A very good example of the difference in the two procedures is illustrated in the case of 1 patient who had 2 similar cataracts. At the limbus of the eye in the 6 o'clock position was a large growth, presumably an arrested congenital dermoid. In this eye, so-called stripping of the zonule was impossible; the force had to be exerted against the sclera and consequently against the vitreous. Semifluid vitreous was lost. In the other eye no vitreous was lost, and postoperatively the vitreous was found to be semifluid also.

In the method of tumbling described here, it makes little difference how well the pupil is dilated. The important question is not how well the pupil is dilated, but how well it will dilate. A normal-sized lens can be delivered through a relatively small pupil without too much trauma to the sphincter. An atrophic iris will not so readily accept such stretching. We are more concerned here with the possibility of iritis An atrophic iris is not only more prone to postoperative inflammation, but such inflammation is more difficult to handle, because the iris is rather refractory to cycloplegics

When the capsule breaks before the lens is delivered from the wound, it is desirable to pick up the remaining capsule if at all possible A great aid in this maneuver is the Hildreth lamp This will "fluoresce' both capsule and cortex and facilitate their removal

The injection of air into the anterior chamber is highly desirable It has a twofold purpose First of all, it splints the iris and irons it out flat, discouraging any early prolapse or even contact with the wound Furthermore it helps to restore not only the anterior chamber but the intraocular volume and pressure An air bubble can actually be harmful, however If the pupillary portion of the iris is depressed, the ciliary region may actually be heaved forward toward the wound When an iridectomy has been done, the pillars may be similarly pushed against the cornea In any case one should not permit air to enter the posterior chamber There may be some argument that air acts as a foreign body, but clinically this does not appear to be the fact

Pilocarpine is valuable postoperatively as a miotic Some surgeons use eserine This is satisfactory, but it should be combined with pilocarpine when a retrobulbar injection has preceded the operation After this injection no acetylcholine is liberated which renders an anticholinesterase somewhat useless until the effect of the novocaine has worn off Pilocarpine is adequate in most cases and rarely causes discomfort Eserine occasionally causes discomfort and is inclined to induce a more plasmoid aqueous

The objection to any ointment in the eye after the operation is justified when no sutures are used In the procedure described here, entry of ointment into the anterior chamber is almost impossible and has not been observed Preference is given to the antiseptic properties of the ointments Any sulfonamide or antibiotic is satisfactory

For a dressing the lid is closed and held in place with the lid sutures taped to the cheek Before the patch is applied a perforated Celluloid* dressing is placed over the lids This prevents the pad from adhering to the lashes or the lids An aluminum shield is preferred to a large mask of the Ring type The latter is difficult to apply and even more difficult to remove because of the extensive manipulation of the head There seems little reason to patch the opposite eye

RESULTS

This report is based on the results in 300 consecutive cataract operations Except for the visual results and the amount of postoperative astigmatism, all 300 cases are included in the statistics Patients with other pathologic conditions, such as retinitis pigmentosa, senile macular degeneration, glaucoma, chorioretinitis etc, are not included in the data on visual results or astigmatism

Intracapsular Extraction — So convinced are we of the advantages of intracapsular over extracapsular extraction, that an extracapsular extraction is rarely attempted It is performed only when it is apparent that the zonule is too resistant or the capsule is adherent to surrounding structures, especially the hyaloidea vitrea

Our criterion for an intracapsular extraction is that the lens capsule must be intact when it leaves the wound, examination of the lens reveals no rent in the capsule and subsequent examination of the eye shows no evidence of cortical or capsular remains An extraction in which the capsule is broken prior to or during delivery through the wound, even though all cortex and capsule are removed afterward, is indicated as plus minus Any flakes of cortex or capsule, however small, evident at the conclusion of the operation or during the convalescence are indicated as extracapsular extractions

By these standards 84 per cent of our operations were intracapsular extractions An additional 9 per cent were plus minus extractions, and 7 per cent were extracapsular extractions Of the 21 extracapsular extractions needlings were subsequently necessary or advisable in 4 cases Of the 41 hypermature cataracts, 74 per cent were removed in the capsule An additional 12 per cent were plus minus It is interesting that only one of the hypermature cataracts with extracapsular extraction required a subsequent needling

TABLE 1.—*Patients Under 45 on Whom Intracapsular Extraction Was Attempted*

Patient	Sex	Age	Type of cataract	Type of extraction	Final vision
1	M	30	Cataracta lacta .	Intracapsular	20/15
2	M	43	Retinitis pigmentosa	Intracapsular	20/100
3	F	23	Posterior traumatic; hypermature	Intracapsular	20/20
4	F	42	Congenital	Intracapsular	20/20
5	F	42	Congenital	Intracapsular	20/20
6	M	43	Posterior subcapsular	Intracapsular	20/15
7	M	43	Posterior subcapsular	Intracapsular	20/20
8	M	33	Posterior subcapsular	Intracapsular	20/15
9	M	33	Posterior subcapsular	Intracapsular	20/20
10	M	26	Congenital	Intracapsular	20/20
11	M	26	Congenital	Intracapsular	20/25
12	F	42	Morgagnian; diabetes	Intracapsular	20/20
13	F	42	Posterior subcapsular; diabetes	Extracapsular (+ −)	20/20
14	F	37	Posterior subcapsular; diabetes	Intracapsular	20/15
15	F	37	Posterior subcapsular; diabetes	Intracapsular	20/15
16	M	44	Posterior subcapsular; diabetes	Intracapsular	20/15
17	M	30	Complicated	Extracapsular	20/20
18	F	38	Complicated	Intracapsular	20/20
19	M	33	Retinitis pigmentosa	Extracapsular (+ −)	20/25

Vitreous loss or vitreous presentation including those cases of fluid vitreous was encountered in 11 cases (3.6 per cent).

In the entire series, the sphincter was left intact in 96 per cent of the cases.

AGE

It is a common dictum among ophthalmic surgeons that the older the patient, the easier the subluxation of the lens. Furthermore, Knapp[13] has stated that persons under 45 years of age are not usually suited for intracapsular extractions. The results in patients under 45 years of age have been very interesting. In this series are 19 eyes (13 patients) on which intracapsular extractions were attempted (Table 1). Of these, 16 were removed in the capsule and 2 were classified as plus-minus. Case 17 in Table 1 subsequently required a needling. Round pupils were retained in the entire series.

Two observations are worthy of note. In only 3 of the cases was the zonule found to be abnormally resistant, and in only 1 case (Case 11) was there any abnormal postoperative reaction. As a matter of fact, there was a conspicuous absence of reaction in all of these patients The patient in Case 9 is worthy of special consideration. He was one of the patients in whom prolapse of the iris occurred; it was evident on the first dressing. The iris was reposited without difficulty, and he has a perfectly round pupil with good vision. The operation was performed with sodium pentothal anesthesia because of marked anxiety. Postoperatively the patient suffered from retention of urine, which we believe to have been a possible factor in his prolapse.

The youngest patient in this series was 26 years old. He is the youngest patient upon whom we have attempted an intracapsular extraction. His convalescence was uneventful.

HYPHEMA

Prior to the use of corneal sutures we encountered hyphema in some 6 to 8 per cent of cases. In several of these the condition was rather severe and resulted in definite visual impairment. In this series of 300 cases hyphema was encountered in only 6 cases, and it was never severe. In the case in which it was most extensive it followed an accidental self-inflicted blow with the patient's fist. Between dressings the patient was pulling up his bed clothing when his hand slipped and struck his unshielded eye. Prolapse of the iris resulted, and the blood did not even cover the entire pupillary aperture. All traces were absorbed in two days, and his final vision was 20/15.

In the other 5 cases the bleeding was very slight and practically insignificant. In 3 of them it followed self-inflicted trauma. In 1 case in which no trauma could be traced hyphema occurred at night in a patient with chronic uveitis. In the sixth case there was a slight streak of blood in the aqueous the day after removal of the sutures. In none of these 5 cases was the blood grossly visible at the end of twenty-four hours.

We feel that the infrequency of hyphema is one of the greatest advantages of a corneal incision. There is no more depressing episode than to see an otherwise perfect result marred by blood mixed with vitreous. With a corneal incision the fear of any bleeding is practically nil.

The lowest incidence of hyphema was reported by Stallard,[14] who encountered no hyphema in 107 cases. However, Leech and Sugar[15] used the same technic and noted an incidence of 4.6 per cent. Hughes and Owens,[16] in reviewing 2,086 extractions of senile cataract, recorded an incidence of 9.3 per cent. When corneoscleral sutures were used, the incidence was 4.6 per cent.[1] Lee,[18] using a modified Liegard corneo-episcleral suture, reported hyphema in 6.6 per cent of his cases. Kirby's series[19] showed hyphema in 8 per cent of his operations for cataract. McLean[20] reported an incidence of 3.6 per cent.

We have no doubt that the general condition of the patient has little to do with the incidence of hyphema, at least when a corneal incision is used. Not one of our 6 patients with hyphema had either diabetes or arterial hypertension. Furthermore, in this series there were 33 patients with diabetes, in some instances severe, and hyphema was not encountered in any of them. Philps[21] expressed the opinion that there is a tendency to hemorrhage from the iris in cases of diabetes. This is probably true of rubeosis iridica diabetica, but it has not been our experience when rubeosis was absent.

INCOMPLETE WOUND CLOSURE

A shallow or obliterated anterior chamber is an indication that wound closure is not secure

TABLE 2.—*Comparative Data on Several Series of Cataract Extractions with Deep Sutures*

Author	Number of cases	Intracapsular extractions %	Delayed or incomplete wound closure %	Hyphema %	Iris or vitreous prolapse %	Iritis %	Retinal detachment %	Secondary glaucoma %	Average amount of astigmatism	Selected (extraneous causes of poor vision excluded†) %
De Roeth	35 (unselected)	63 + 8*	8.6	5.7	2.8	0	0	0	1.6 D	
Stallard	107	25		None		0			1.5-2.5 D	
McLean (series 2)	110 (unselected)	88	3.6	3.6	2.7	0			1.32 D	
Leech Sugar (series 2)	150	51	2.6	4.6	4	0			1.82 D	
Kirby	100 (unselected)	90 + 1*		8	1.0	6	1	3	1.5 D	Unselected vision 20/30 or better 86%, 20/200 or less 4%
Hughes Owens (series 2)	380 (selected)		0.3	4.5	1.2	1.4	0.5	1.6	1.1 D	20/30 or better 91.7%, less than 20/200 1.9%
Wolfe	300 (unselected)	84 + 9* (96% round pupils)	1.2	2	1.6	1	None	0.6	0.92 D	20/30 or better 97%, less than 20/200 0

*Cases in which the capsule and cortex were removed in toto after expulsion of the lens.

†Excluded are such cases as those in which there was inadequate refraction or in which extraneous causes existed for poor vision (uveitis, senile macular degeneration, retinitis pigmentosa, diabetic retinopathy, etc.)

At some time during the postoperative course there were 15 cases in which the chamber was flat and an additional 21 in which the chamber was abnormally shallow. The average number of days in which the chamber was abnormal was three. The phenomenon existed five days or longer in 8 cases.

Secondary glaucoma occurred in 2 cases. In 1 of these, an air bubble was not injected into the anterior chamber at the conclusion of the operation and the chamber remained flat or nearly so for thirteen days. In the other case the chamber was never flat but remained shallow for fourteen days. Consequently, a shallow chamber may have the same qualitative significance as an obliterated chamber.

Most commonly the phenomenon of abnormal chamber occurred on the tenth to the twelfth day. In some cases it followed removal of sutures, but in nearly an equal number it preceeded removal of the sutures. In some patients a leaky wound could be demonstrated, but in most of them no cause for the abnormal chamber could be demonstrated.

Comparative statistics for these data are difficult to evaluate. For instance, McLean presented figures for delayed union of the wound or delayed reformation of the anterior chamber. Whether he included only first dressings, delayed loss of chamber following removal of sutures, etc. is not clear. Leech and Sugar recorded data on absence of the anterior chamber at the first dressing. De Roeth,[22] in reporting a series of 35 unselected cases, gave statistics for delayed refilling of the anterior chamber but did not mention late loss of the anterior chamber.

PROLAPSE OF IRIS

Prolapse of the iris occurred on 5 occasions, an incidence of 1.6 per cent. In 1 patient the prolapse occurred on the seventh postoperative day. He became irrational and struck his eye during the night. The wound was broken open, and excision of prolapsed iris and vitreous was necessary. In 1 patient, prolapse of the iris and hyphema developed on the tenth postoperative day when he struck his eye with his fist. There was no vitreous presentation, but iridectomy and closure of the wound were necessary. His final vision was 20/20. One patient, aged 33, had prolapse of the iris on the first postoperative day. This case has already been discussed. In the fourth patient an iris prolapse developed on the first postoperative day. Shortly after she returned from the operating room, an ambulatory patient had an attack of epilepsy outside her room and a relative fainted. This upset the patient considerably and may have contributed to the prolapse. The iris was reposited on the first postoperative day, but the pupil remained slightly notched. The patient's vision is now 20/20. In the fifth case the prolapse occurred without evidence of trauma. The iris was reposited satisfactorily except that the pupil remained notched at 12 o'clock.

None of these patients except the second one had hyphema. Only the first one had prolapse of vitreous with the iris prolapse. All regained normal vision except the first, whose vision on discharge was 20/50. In the last 2 cases the incision was carried into the scleral side of the limbus, and this is believed to have encouraged the prolapse.

Whereas actual incarceration of the wound occurred in only 1.6 per cent of cases, further elaboration is necessary. Of the cases of loss of chamber, it was found that the iris was adherent to the inner surface of the wound in 10 per cent. Grossly this is evident as a slight difference in the depth of the chamber at 6 and 12 o'clock, or there may be a slight drawing up of the pupil. The phenomenon is best seen by means of the gonioscope. It may have occurred in other cases which were not examined gonioscopically. In only 2 of these cases was an elevated tension encountered, and these have been previously described under loss of chamber. In some patients the adhesion involved only a pinhead-sized area. In others the adhesion extended for 30 arc degrees.

POSTOPERATIVE ASTIGMATISM

One criterion for effectiveness of wound closure is the resultant astigmatism. That a corneal wound is followed by less astigmatism than a scleral wound is evidenced by our observations. All cases in which an accurate refraction could be performed are tabulated. Cases of macular degeneration, retinitis pigmentosa, chorioretinitis, etc., are excluded.

The average corneal astigmatism was 0.92 diopters. Only 6 per cent of our patients had astigmatism greater than 2 diopters 2 per cent had 3 diopters of astigmatism, and in no case was the astigmatism greater than 3 5 diopters So far as we know, this is the lowest incidence of *astigmatism in any reported series of cases*

POSTOPERATIVE UVEITIS

It is difficult to tabulate statistics on the incidence of iritis Any surgical procedure in which the iris is disturbed by direct or indirect trauma will be followed by some hyperemia of *the iris Furthermore, to make an accurate* determination of the incidence of iritis, it would be necessary to examine all patients at the slit lamp daily This we have not done It is also difficult with a mature cataract to tell whether postoperative uveitis is an initial inflammation or an acute exacerbation We have included all cases of postoperative uveitis in which a diagnosis of uveitis was not made preoperatively

We encountered postoperative uveitis in 12 patients, an incidence of 4 per cent This includes late uveitis, which may occur several months after operation When it does so, the onset is usually precipitated by rupture or disintegration of the hyaloid membrane In 3 cases the eye was not inflamed, but the patient complained of discomfort, slit lamp examination disclosed rupture of the hyaloid with entry of vitreous into the anterior chamber As a rule the symptoms promptly subside when the pupil is dilated with a cycloplegic Four other patients had late uveitis with rupture of the hyaloid membrane, and the inflammation was more severe

A complicated form of cataract that receives scant attention in the literature is a milky nuclear sclerosis with dustlike vitreous opacities The visual loss is usually out of proportion to the opacity Under the best of circumstances convalescence is slower than with other types of cataract This is a cataract that *must be removed in the capsule An extra*capsular extraction is nearly always associated with postoperative uveitis and all too frequently retinal detachment due to contraction bands in the vitreous

In 5 cases of acute uveitis the condition was attributed to retained lens cortex after extracapsular extractions In 3 of these the cataracts were hypermature and in 1 of this group the condition was rather severe The patient's recovery was complete and his final vision was 20/20

GLAUCOMA

In 2 of our patients postoperative glaucoma developed owing to delayed re formation of the chamber and the anterior synechiae Upon 1 patient who was a diabetic, an iridencleisis was successfully performed This patient has been under observation for nine months after *the iridencleisis On last inspection her tension* was 18 (Schiotz) without miotics In 1 other patient secondary glaucoma developed but has been successfully controlled with furmethide 10 per cent On last examination the tension was 16 (Schiotz) Gonioscopic study shows adhesions for about two fifths of the circumference of the angle In both of these cases the chamber was shallow or nil for thirteen to fourteen days

Whenever one must perform a filtering operation on an aphakic eye, the absence of scarring in the subconjunctiva is certainly an advantage In the absence of prolapsed uveal tissue, capsule, etc and with an intact vitreous, filtering operations would undoubtedly be more successful were it not for the scarring encountered

One should have great respect for a shallow or obliterated anterior chamber Some surgeons find that the use of miotics encourages reformation of the chamber, probably because in such cases the iris is partially incarcerated or the vitreous herniated forward Miotics may present no risk in a quiet eye but they should be used cautiously in a congested eye Eserine particularly, is prone to result in an albuminoid aqueous, which is apt to promote the development of synechiae

In principle injection of air to restore the chamber several days after the operation seems sound We feel, however, that the danger of infection is too great and do not recommend it

OTHER COMPLICATIONS

No case of infection detachment of the retina expulsive hemorrhage or corneal dystrophy was encountered However, few of these patients have been followed for longer than a year, therefore the absence of such complications as retinal detachment permits no conclusions.

VISUAL RESULTS

The visual results with this technic have been most gratifying. Excluding cases in which extraneous conditions accounted for diminished vision, vision of 20/30 or better was obtained in 97 per cent. The main cause of poor vision was uveitis with development of a cyclitic membrane or prolapse of cloudy vitreous into the anterior chamber. The poorest vision in this series was 20/70. Of course, there were many cases of diabetic retinopathy, central choroiditis, senile macular degeneration, retinitis pigmentosa, etc., in which we could not hope to obtain normal vision. When all cases were included, regardless of the underlying pathologic conditions, vision of 20/30 or better was obtained in 85 per cent of the entire series.

SUMMARY AND CONCLUSIONS

A technic is described for the operative treatment of cataract, in which the incision is made in clear cornea with preplaced sutures. The advantages of such an incision are: (*a*) hyphema is reduced in incidence and when it does occur is never severe; (*b*) there is even less corneal astigmatism than when corneoscleral sutures are used; (*c*) prolapse of the iris is also infrequent, and (*d*) if secondary glaucoma occurs, an undisturbed subconjunctival tissue increases the chances for a successful filtering operation.

The disadvantage of such an incision would seem to be that healing of the wound is not as secure. This conclusion is based on the incidence of partial or complete loss of the anterior chamber. However, it is possible that we have been too critical in our statistics, since any anomaly of the depth of the anterior chamber was included as abnormal. In addition, we feel that such an abnormal chamber is not necessarily a criterion of effectivness of wound closure. In most of these cases no leakage of the wound could be demonstrated. It is quite possible that the vitreous and particularly the hyaloid membrane may play a role in preventing communication between the anterior and posterior chambers.

Recently we have modified our technic so that the knife incision is placed obliquely to the surface of the cornea and have performed two iridotomies instead of one. The results with this modification are very encouraging, but a sufficient number has not been performed to draw any conclusions.

The ideal closure for cataract operations is yet to be described. Corneal incisions as herein described offer certain advantages over corneoscleral incisions. It is hoped that this presentation will encourage others to experiment further with corneal incisions.

RÉSUMÉ ET CONCLUSIONS

On décrit une technique de traitement opératoire de la cataracte, dans laquelle l'incision est pratiquée dans une cornée transparente dont les sutures ont été préparées en avance. Les avantages de cette incision sont que: a) l'hyphémie est arrêtée si elle survient, et quand elle apparait, elle n'est jamais grave; b) il y a moins d'astigmatisme cornéal que lorsqu'on se sert des sutures cornéosclérales; c) le prolapsus de l'iris est aussi peu fréquent, et d) si un glaucome secondaire survient, un tissu sous-conjonctival, que l'on a respecté, augmente les chances de succès d'une opération destinée à permettre le passage de la vision.

L'inconvénient d'une telle incision pourrait être que la cicatrisation de la plaie n'est pas aussi sûre. Cette conclusion s'appuie sur la possibilité d'une perte partielle ou complète de la chambre antérieure. Cependant, il est possible que nous ayons été trop sévère dans nos statistiques, du fait, que toute anomalie dans les dimensions de la chambre antérieure fut considérée comme anormale. De plus, nous estimons qu'une telle chambre anormale n'est pas nécessairement un critère pour la réalisation de la fermeture de la plaie. Dans beaucoup de ces cas on n'a pu trouver de suintement de la plaie. Il est fort possible que la vitrée et, particulièrement la membrane hyaloïde puissent jouer un rôle en empêchant la communication entre les chambres antérieures et postérieures.

Récemment nous avons modifié notre technique de telle façon que l'incision du couteau soit faite obliquement à la surface de la cornée et puisse accomplir deux iridotomies au lieu d'une. Les résultats obtenus par cette modification sont très encourageants, mais nous

n'en avons pas pratiqué un nombre suffisant pour en tirer quelques conclusions valables

La fermeture idéale pour les opérations de cataracte attend toujours d'être décrite Les incisions cornéennes telles que nous les avons décrites, nous offrent certains avantages sur les incision cornéosclérales Nous espérons que ce travail encouragera d'autres chirurgiens à pousser plus loin leurs expériences des incisions cornéennes

RESUMEN Y CONCLUSIONES

Se describe una técnica para el tratamiento operatorio de la catarata en la que se realiza una incisión en la córnea que tiene las siguientes ventajas a) se reduce la frecuencia del hipema y si se presenta, nunca es grave, b) se produce menos astigmatismo corneal que cuando se usan suturas córneoesclerales, c) es también poco frecuente el prolapso del iris, y d) si se desarrolla glaucoma, al no estar alterado el tejido subconjuntival ello aumenta las probabilidades de que la operación de filtración tenga un resultado satisfactorio Las desventajas de dicha incision parecen ser que la curación de la herida no es tan segura, basándose esta conclusión en la frecuencia con que acaece la pérdida parcial o total de la camara anterior Es posible que se haya sido excesivamente crítico en el juicio de las estadísticas, en las que se incluyeron como anormales cualquier anomalía de la profundidad de dicha cámara anterior Por añadidura la existencia de una cámara anormal no es necesariamente un requisito en el que poder basar la efectividad del cierre de la herida En la mayoría de los casos no puede demostrarse la existencia de alteraciones en el cierre de la herida, siendo posible que el cuerpo vítreo y especialmente la membrana hialoide desempeñen un papel en la prevencion del desarrollo de una comunicacion entre las camaras anterior y posterior

Recientemente se ha modificado esta técnica para que la incisión se realice de un modo oblicuo a la superficie de la córnea, habiéndose realizado dos iridotomías en lugar de una sola Los resultados con esta modificación son muy alentadores si bien todavía no se han intervenido un número suficiente de casos para poder llegar a deducir ninguna conclusión

Todavía no se ha descrito el cierre ideal de la herida en la operación para el tratamiento de las cataratas Las incisiones corneales aquí descritas presentan ciertas ventajas sobre las incisiones córneoesclerales, confiándose que este artículo estimule a otros autores a seguir experimentando con las incisiones corneales

RIASSUNTO

Descrive un metodo operatorio per la cura della cateratta, che si basa sopra un'incisione condotta direttamente sopra la cornea, con suture preposte I vantaggi di quest 'incisione consisterebbero a) nella minore frequenza di emorragie nella camera anteriore e—qualora presenti—in una loro minore intensita' b) in un minore astigmatismo della cornea in confronto alle suture corneoscleroidee c) in una minore frequenza anche di un prolasso dell'iride d) in una migliore prognosi operatoria (per filtrazione) qualora insorga un glaucoma secondario, dato che il tessuto sottocongiuntivale non viene disturbato dalla prima operazione per cateratta

Un'obbiezione a questo metodo sembra derivare dall 'incostanza di una perfetta chiusura della ferita e con cio', dalla frequenza di una parziale o completa perdita della camera anteriore Ma una camera anteriore anormale non rappresenta necessariamente un criterio per giudicare la perfezione di guarigione della ferita Nella maggioranza dei casi l'A non ha riscontrato una permeabilita' della ferita Puo' darsi che il vitreo e specialmente la membrana ialoidea esercitino una funzione importante nel prevenire una comunicazione fra camera anteriore e posteriore

Negli ultimi tempi l'A ha modificato la tecnica operatoria, nel senso che l'incisione sulla superficie della cornea viene condotta in senso obliquo mentre viene eseguita una doppia iridotomia I risultati sembrano incoraggianti ma il numero delle operazioni cosi eseguite non e' sufficiente per autorizzare delle conclusioni definitive

L'A conclude invitando altri specialisti ad operare le cateratte con un'incisione corneale invece delle solite incisioni corneo sclerali

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Tantalum Gauze Repair of Incisional Hernia

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TANTALUM is a dull, grey, relatively inert, heavy metal having an atomic weight of 181.4. During the recent war it proved its adaptability for use in skull plates and nerve sheaths and also as suture material. During the past year five reports have appeared in the literature describing its use as an adjunct in the repair of hernia in the absence of adequate tissues. For hernia repair tantalum is used as a fine screen composed of wire 0.003 inch in diameter woven in 50-50 mesh. Since the metal provokes no foreign body reaction, it may be left in place permanently, even in the presence of infection.

The first use of tantalum gauze in hernia repair was made by Ferris[1] at the Mayo Clinic. Since then 53 assorted hernias have been repaired successfully and presented in the literature. Throckmorton[2] reported 15 cases, 2 of ventral, 12 of inguinal, and 1 of obturator hernia. In 1 case healing was firm and normal despite postoperative wound infection. Koontz[3] reported 5 cases of ventral hernia. Jefferson and Dailey[4] described a ventral hernia with insufficient tissue for closure successfully repaired with a double thickness of tantalum gauze. In 32 unitemized cases Douglas[5] had no failures. He stated that in experimental animals implanted gauze is so firmly infiltrated by fibrous tissue that it can be removed only by digestion of the connective tissue with proteolytic enzymes. Tantalum, on the other hand, was completely unchanged by implantation.

REPORT OF CASES

Case 1—Mrs. A. F., a 38 year old white woman, presented herself at this clinic on July 31, 1948 with a ventral hernia of twelve years' duration. The hernia had followed a pelvic operation. Since then she had undergone five operative repairs by various surgeons. On each occasion the hernia recurred before she left the hospital or shortly after.

Although obese the patient was apparently in good health except for a large flat hernia that extended 4 inches to the left and 2 inches to the right of the midline below the umbilicus. Just under the umbilicus there was a defect in the abdominal wall that would admit four fingers of the examining hand. Laboratory examination revealed no abnormality except a 4 plus reaction for sugar in the urine and a fasting blood sugar value of 299 mg. per hundred cubic centimeters. Under care of Dr. Harold J. Morris, she was admitted to the hospital for control of her diabetes. After she had been sugar free for several days, operation was performed. A large hernial sac of about 1 quart capacity was found spread out under the skin and opening into a defect about 2 inches in diameter in the abdominal wall just below the umbilicus. The sac was freed with difficulty, as were the muscles and fascia. The sac was excised and the hernia repaired by imbrication of the fascia with interrupted cotton sutures. Over the fascia a sheet of tantalum gauze 6 x 6 inches, with ¼ inch of the edges folded under, was sewn with interrupted sutures of No. 0.005 tantalum wire, without tension. The skin was closed with interrupted cotton sutures. Recovery was uneventful and on the eleventh postoperative day (Aug. 24, 1948) the patient was discharged, a diabetic diet and insulin having been ordered. On August 28 the wound was healed. A small raised area was noted in the left inguinal region and was thought to be scar tissue. On September 11 the weight of her pendulous abdomen had wrinkled the gauze, producing unsightly lumps, but there was no sign of recurrence. She was advised to wear a hernia belt for six months, which soon reflattened the gauze. On October 6 the value for blood sugar was 124 mg. per hundred cubic centimeters. At the time of writing she feels fine.

Case 2—Mrs. M. S., a 49 year old white woman, presented herself at the clinic July 26, 1948 complaining of a huge abdominal hernia. She had been operated on ten years earlier for "intestinal prolapse," after which she had a wound infection and subsequently a hernia. The hernia became larger as time passed. The patient was small but obese, with a huge saclike mass between the umbilicus and the pubis. It was approximately the size of a football and was completely reducible. At the apex of the sac was an indolent ulcer the size of a five cent piece. Examination otherwise re-

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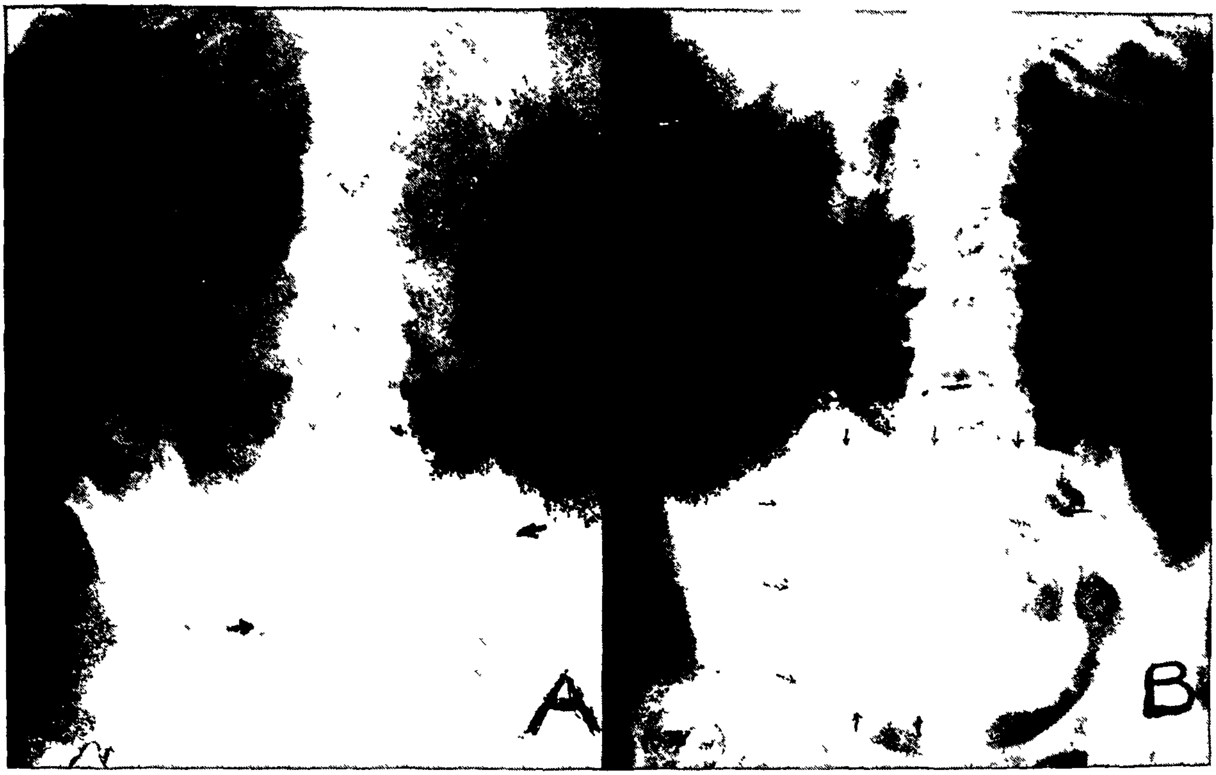

Fig. 1. (Case 1).—*A*, folding of the gauze that produced "lumps" on the patient's abdomen. *B*, tantalum gauze in place just after the patient's discharge from the hospital.

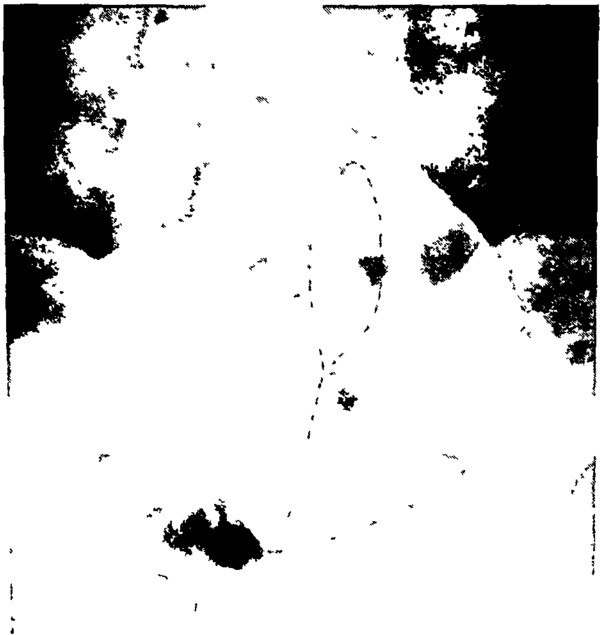

Fig. 2. (Case 2). Roentgen film of abdomen after operation, showing the gauze in place. It was necessary to turn the square diagonally in order to cover the defect properly. This is indicated by the dotted line drawn on the film.

vealed no abnormality. She was hospitalized, and on August 10 the hernia was repaired. Just under the skin was a huge sac of approximately 2-quart capacity, filled with bowel. The muscles were completely buried in scar tissue, and the fascia ended at about the center of the muscle bellies. As much of the muscle as possible was freed, but still left a defect about 2½ x 1½ inches which it was impossible to close. In order to protect the bowel from the gauze and to help fill the dead space, the sac was not excised but was inverted and the muscles approximated as far as possible with No. 0 chromic catgut. A square of tantalum gauze measuring 6 x 6 inches, with the edges folded under, was sutured over the defect with as little tension as possible, with interrupted sutures of No. 0.005 tantalum wire. The skin was then closed with interrupted cotton sutures. A small Penrose drain was left in the lower end of the incision just under the skin, and was removed after twenty-four hours.

Postoperatively the patient showed a mild wound infection which, on culture, yielded clusters of gram-positive cocci. Under chemotherapeutic measures this cleared up in a few days, and on the twentieth postoperative day the patient was sent home. Her abdomen was completely healed except for a small sinus at the middle of the scar. This drained until it healed on November 2 She was discharged at that time, there was no sign of recurrence four months after the operation She was provided with a ventral hernia belt on discharge from the hospital, with instructions to wear it for six months

SUMMARY AND CONCLUSIONS

This paper presents a review of the literature on the use of tantalum gauze in the repair of incisional hernia adding 2 new cases The first case is of special interest since, as far as can be determined, it represents the first use of this material in a diabetic patient, for whom it has proved not only innocuous but apparently valuable Also of interest are the lumps produced by the bending of the gauze, which were subsequently smoothed out by the use of a hernia belt

The second case adds evidence of the efficacy of this material in the presence of infection and in the absence of adequate tissue to cover the defect properly Tantalum gauze is proving itself to be a most valuable addition to the armamentarium of the progressive surgeon

RIASSUNTO

Passa in rassegna la letteratura sopra l'uso di garze di tantalo nelle operazioni per ernie laparatomiche Aggiunge due casi operati personalmente Il primo e' interessante perche' occorso in un diabetico Il nuovo materiale plastico e' riuscito non solo innocuo ma utilissimo per il riparo dell'ernia I noduli provocati dalle pieghe della garza sono stati successivamente appianati dall'uso di un cinto erniario

Il secondo caso dimostra l'efficacia del materiale plastico anche in presenza di infezioni ed allorquando manchino tessuti sufficienti per ricoprire adeguatamente il difetto

Le garze di tantalo rappresentano quindi un'utilissima aggiunta all'armamentario del chirurgo moderno

SUMARIO

Este artículo presenta una revista de la literatura sobre el uso de la gasa de tántalo en el tratamiento de las hernias incisionales agregando dos casos nuevos El primer caso es de interés especial por cuanto aparentemente y según la literatura, es el primero en que se ha usado dicho material en un paciente con diabetes En este paciente su uso fue innocuo y aparentemente de valor También es de interés porque fue posible desplegar las masas formadas por la gasa con el uso de la correa hernial

El segundo caso atestigua aun mas la eficiencia de este material en casos complicados por infeccion o por la falta de tejido suficiente para cubrir el defecto completamente La gasa de tántalo esta probando ser una de las adiciones mas valiosas del arsenal quirúrgico

RÉSUMÉ ET CONCLUSIONS

Cet article nous présente une revue des travaux faits sur l'emploi de la gaze de tantale pour réparer une hernie de la cicatrice, en ajoutant deux cas nouveaux Le premier cas présente un intérêt particulier parce que, autant qu'on peut le préciser, il représente la première utilisation de ce matériel chez un malade diabetique pour lequel il s'est montré non seulement inoffensif mais apparemment d'une certaine valeur Les saillies produites par le bombement de la gaze sont d' un certain intérêt car elles furent ultérieurement reduites par l'emploi d'un bandage herniaire

Le second cas montre l'evidence de l'efficacité de ce matériel en présence d une infection et en l'absence d un tissu approprie pour couvrir véritablement la partie défectueuse La gaze de tantale s est démontré comme étant d'une certaine valeur et qu'il fallait l'ajouter à l'arsenal therapeutique du chirurgien tres averti

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The Problem of Bronchogenic Carcinoma

Review of Literature and Statistical Study of Sixteen Cases

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ALTHOUGH bronchogenic carcinoma was virtually unknown twenty-five years ago, it is today recognized as an important clinical entity. It is striking indeed that the *Quarterly Cumulative Index Medicus* registered but one reference on cancer of the lung in 1920. Bayle[1] in 1810 was apparently the first to describe this malady. In 1912, Adler's[2] monograph "Primary Malignant Growths of the Lungs and Bronchi" began as follows: "Is it worth while to write a monograph on the subject of primary malignant tumors of the lung?" He further stated, ". . . there is nearly complete consensus of opinion . . . that primary malignant neoplasms of the lungs are among the rarest forms of disease." Holmes and Ruggles[3] in 1926 observed, "Primary malignancy of the lung is rare."

Today, however, this type of carcinoma is so common that it arises at once in the mind of the medical student when he encounters a patient with pulmonary symptoms. Indeed, in patients of the cancer age presenting signs and symptoms of pulmonary disease that offer diagnostic difficulties, primary carcinoma of the lung is always considered a diagnostic possibility.

It has been estimated that approximately 15,000 persons die annually in the United States of bronchogenic carcinoma.[4] During the year 1940, according to the U. S. Government Report, this condition was the cause of 5,556 deaths. Per 100 000 of population, the death rate was 1.1 in 1920, 2.2 in 1930 and 4 in 1940.[5] It would appear, therefore, that cancer of the lung constitutes about 1 per cent of all cases of malignant disease observed at autopsy, and more than 8 percent of all cases of malignant disease discovered post mortem.[6]

From a position of obscurity a quarter of a century ago, pulmonary carcinoma has risen to such prominence that investigators have rated the lung second in frequency only to the stomach as a primary site of malignant growth. Recently, statistical studies at St. Louis City Hospital[7] and at the Charity Hospital in New Orleans[8] have shown that primary carcinoma of the lung is actually more frequent than primary carcinoma of the stomach.

The recent increase in bronchogenic carcinoma may be apparent or real or both. A study of the literature suggests that the greater part of the increase is apparent, but no one is prepared to state that none of it is real.

Ochsner and DeBakey[9] stated that pulmonary carcinoma is definitely increasing. This was confirmed by Rosahn,[10] who found that the ratio of pulmonary carcinoma to all carcinoma at Yale University Medical School rose from 7.4 per cent for the period from 1917 to 1927 to 11 per cent for the years 1928 to 1937. Jaffe[11] and Steiner[12] expressed the opinion that the increase in frequency is more apparent that real. Klotz,[13] from a detailed review of the literature, concluded, "Most authors consider the increase purely apparent."

This problem has broad implications. If the increase in pulmonary carcinoma is merely an expression of the aging of a population provided with improved diagnostic facilities and sharper clinical acumen, little can be done by way of prophylaxis. On the other hand, if the increase is greater than can be expected on the basis of increasing numbers of persons in the older age groups, greater even than can be ascribed to modern and accurate diagnostic methods, attention can be directed to the elucidation and perhaps the ultimate elimination of the possible causative factor or factors.[10]

In rationalizing the apparent increase of primary carcinoma of the lung, Peery[14] con-

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cluded that prior to 1900 this tumor was diagnosed less often because of the current belief that it was exceedingly rare and that when it did occur it was usually metastatic. He expressed the opinion that bronchogenic carcinoma is diagnosed more frequently today than is justified. Involvement of the bronchial mucosa, which is generally considered one of the diagnostic criteria, is not reliable, since metastases to the bronchial mucosa are relatively common. The abandonment of such diagnoses as "endothelioma of the pleura," "oat-cell tumor of the mediastinum" and "tumor of the superior pulmonary sulcus" and the placing of all tumors formerly designated by these terms in classification of "primary carcinoma of the lung" have swollen the statistics rather than increased the incidence of the disease. Fried[4] pointed out that, progress in public health having resulted in increased longevity, more people are naturally reaching the "cancer age."

Rosahn[16] analyzed 435 carcinomas of the lung in 425 different persons observed in a series of 4 114 autopsies at Yale University between 1917 and 1937. He concluded (*a*) that the increased incidence is due to improved clinical and pathologic methods of diagnosis, (*b*) that increased attention has been drawn to this malady, (*c*) that tumors once classified by pathologists as sarcomas are now classified as epithelial tumors of the oat cell variety, (*d*) that formerly, carcinoma of the lung was usually considered metastatic, and (*e*) that widespread interest on the part of pathologists has led to the discovery of small pulmonary neoplasms with large metastases, which observers had formerly considered primary lesions. On checking the *Index Medicus* for the past twenty years it is readily apparent that reports on various aspects of carcinoma have increased tremendously, but what is important is that carcinoma of practically every organ, not of the lung alone, is represented by an increasing number of publications.

If one compares the mortality statistics on miners in Schneeberg, Germany, before and after 1922, one is confronted with a remarkable phenomenon.[18] Prior to 1922 most of the deaths were caused by tuberculosis or silicosis and after 1922 the majority (71 per cent, to be exact) were due to bronchogenic carcinoma. It had been known for four hundred years that the miners in Schneeberg suffered from a wasting, progressive pulmonary disease, but it was only in 1922 that a commission headed by Schmorl[3] showed this mysterious disease to be none other than bronchogenic carcinoma. Obviously, it is safe to conclude that, when one's eyes are opened to the true nature of a disease, recognition of a very much larger number of cases must follow.

ETIOLOGIC CONSIDERATIONS

The cause of bronchogenic carcinoma is still undetermined. It is interesting to note that the rise in incidence of this neoplasm has been concomitant with the development of the "machine age." In an exhaustive review of the literature Simons[18] mentioned no fewer than fourteen different predisposing factors. Wegelin[3] distinguished exogenous and endogenous etiologic factors. Definite knowledge concerning the relation of heredity to pulmonary cancer in man is lacking, but it may be that a hereditary predisposition becomes manifest when external noxae are operative in addition.

Exogenous factors in the form of irritants of the bronchial epithelium (and perhaps the lung tissue) are contributory, since they cause acute or chronic inflammation and epithelial metaplasia, which are precursors of cancer. Suspicion has been directed against automobile exhaust gases and the tarring of roads, but the disease is as prevalent in the great open spaces, where the roads are untarred and there are few automobiles, as it is in large cities, nor has the incidence been shown to be higher among garage workers than among others. Cigarette smoking has been incriminated because of the predominant involvement of the male sex, but the increase of female smokers has not led to an increase in the number of pulmonary cancers in women. The influenza epidemic of 1918 used to be blamed for the increased frequency. Tuberculosis cannot be considered a frequent etiologic factor, although carcinoma may develop from the walls of old tuberculous cavities lined with regenerated metaplastic pavement epithelium or from tuberculous scars close to the pleura. Of facts supposedly related to the cause of the disease, the only one of real significance is the "Schneeberg lung cancer" due to radon emana tions. It has been shown that persons living in the Schneeberg district but not engaged in the mines suffered from bronchogenic carcinoma to a much lesser degree than did the miners.

One may conclude, therefore, that knowledge of the etiologic factors is still limited and not well founded; probably both hereditary and acquired disposition and external irritants play a role.

INCIDENCE

Bronchogenic carcinoma is more prevalent in the male than in the female. Ochsner, DeBakey and Dixon[20] in a series of 412 cases, reported 356 (86.4 per cent of the tumors as occurring in men and 56 (13.6 per cent) in women. In a review of 2,047 cases from the available literature, Fried[21] noted that 82.9 per cent of the patients were men and 17.1 per cent were women. This peculiar predilection for the male sex has not been adequately explained. In a group of 16 cases under my own observation, 8 of the patients were male and 8 were female.

The age incidence for bronchogenic cancer is the same as for carcinoma of other organs. In 166 cases studied by Ochsner, Dixon and DeBakey,[22] the following age incidences were noted: second decade, 3.8 per cent; third decade, 1.9 per cent; fourth decade, 9.6 per cent; fifth decade, 26.9 per cent; sixth decade, 38.5 per cent; seventh decade, 17.3 per cent; and eighth decade, 1.9 per cent. The ages of the patients ranged from 19 to 72. More than 80 per cent of Halpert's[23] patients were in the sixth decade or older.

The age incidence in my group of 16 patients is given in Table 1.

TABLE 1.—*Age Incidence of Bronchogenic Cancer*

Age	Number of Cases	Percent
40-49	2	12.5
50-59	8	50.0
60 69	3	18.3
70-79	3	18.3

The average age of the male patients was 58 years; that of the female patients, 60 years.

According to opinions now prevailing, practically all cancers of the lung arise in bronchial tissue. Bronchogenic cancer shows a distinct predilection for the right bronchus. This is generally attributed to the more direct course and greater diameter of the right bronchus, a greater total surface area being exposed to irritation. Holinger,[21] in an analysis of 175 cases, found that the neoplasm occurred on the right in 111 cases, on the left in 60 cases; in 4 cases it was bilateral. Fifty-five of the tumors on the right side were in the primary bronchus within 1 to 2 cm. of the carina; 19 at the orifice of the upper lobe bronchus; 2 at the orifice of the middle lobe, and 32 in the lower lobe bronchus. Of the 60 growths originating on the left side, 20 were in the primary bronchus, 15 at the opening of the upper lobe and 23 in some portion of the lower lobe bronchus. In 4 cases the neoplasm had originated near the bifurcation and involved both bronchi. Peripheral growths were observed in 3 cases on the right and in 2 on the left side. In 343 cases studied by Hollingsworth,[25] 203, or 59.2 per cent, of the tumors were located on the right side, and 138, or 40.2 per cent, on the left; in 2 cases, or 0.6 per cent, there was bilateral involvement. In my own group of 16 cases, the distribution was even between the right and the left lung. The incidence for males was 62.5 per cent and that for females 37.5 per cent on the right. The converse was observed for the left-sided lesions.

Pathologists have distinguished macroscopic types ranging from three to five in number. Thus, Jaffe[11] identifies four types, and Frissell and Knox[26] recognize five. It might be better to distinguish two types, which occur with almost equal frequency. One type grows chiefly outward, spreading through the bronchial wall into peribronchial tissue, whereas the other type grows predominantly into the lumen of the bronchus.

PATHOLOGIC PICTURE

Histogenically, bronchogenic carcinoma has been divided into three groups, according to the epithelial units ascribed to the lungs: (*a*) bronchial epithelium, (*b*) the epithelium that forms the mucous glands and (*c*) the epithelium that lines the pulmonary alveoli. Newburger and Geever[2] expressed the opinion that there is little evidence that bronchogenic neoplasms are ever derived from the alveolar epithelium.

The microscopic picture will point to the histogenesis only in exceptional cases, since the morphologic character of the neoplastic cells varies from one tumor to another. Even in the same tumor the picture may vary from area to area.

Although, histologically speaking, bronchogenic carcinoma possesses a large degree of pleomorphism, certain cellular types predominate, and a microscopic classification would include (*a*) squamous cell carcinoma, (*b*) adenocarcinoma and (*c*) undifferentiated cell carcinoma, which has been called by others "small cell," "round cell," or "oat cell" carcinoma. Cancer with undifferentiated cells has often been diagnosed as sarcoma, lymphosarcoma, round cell sarcoma, oat cell sarcoma or endothelioma. It is generally agreed that primary squamous cell carcinoma of the lung does not result from metaplasia of pre-existing ciliated columnar epithelium but originates through metaplasia of the undifferentiated basal cells of the bronchial mucous membrane. Koletsky,[8] *in analyzing 100 cases of primary carcinoma of the lung, identified* 35 small cell carcinomas, 40 squamous cell carcinomas, 22 adenocarcinomas and 3 tumors classified as carcinoma simplex. Holinger, Hara and Hirsch,[21] in reporting 175 cases, stated that 64 per cent were squamous cell carcinomas, 17 per cent small round cell carcinomas, 6 per cent adenocarcinomas. Analysis of the 16 cases here reported reveals 8 squamous cell carcinomas, 6 undifferentiated cell carcinomas and 2 adenocarcinomas.

In a report of 216 patients, Gebauer[22] brought out the fact that there exists a clinicopathologic differentiation among the various microscopic forms. In his series 66 per cent of *small cell carcinomas arose in the main stem bronchi*. The remainder frequently began near the orifice of a secondary bronchi but rarely arose in a small branch bronchus. The formation of an irregular mediastinal mass is characteristic of this centrally located and rapidly growing tumor. It is highly invasive, extends along the bronchus and surrounds it and the neighboring structures with firm tumor tissue. This process is accompanied by a nonselective invasion of the adjacent lung. Involvement of the pulmonary parenchyma, however, is less conspicuous than mediastinal extension, the neoplasm being vigorously metastatic to adjacent regional and distant lymph nodes.

Adenocarcinomas arose in secondary branches such as the lobar stems, in 70 per cent of Gebauer's cases. Twenty per cent began in small branch bronchi and 10 per cent in the main branch. The central extension of this tumor is less striking than its peripheral growth, which follows the bronchial and vascular channels. Its rapidity of growth varies somewhat with the degree of cellular differentiation but is less marked than that of the small cell tumors. Because of its tendency to arise in secondary bronchi and small branch bronchi, it may form a well circumscribed mass that replaces pulmonary parenchyma and appears as a nodule within the lung. There may be diffuse involvement of the mediastinal lymph nodes, with the formation of irregular masses. Involvement of the peripheral lymphatics may induce pleural effusion.

Squamous cell carcinoma originates, in 70 per cent of all cases, in the first branches of the *main stem bronchi. It grows more slowly than either of the aforementioned two* types, and it affects older persons. Local growth of the primary tumor results in the formation of a nodular mass about the bronchus of origin. This mass has a tendency to central necrosis and cavitation. It extends centrally along the bronchus, causing fixation and constriction of this structure. This extension is not by way of the lymphatics and, although it is invasive, it seems to avoid the lymph nodes. It is extrabronchial in its proximal portion, so that the lumen of the constricted bronchus may reveal mucosal tumor only deep within the entire mass. Peripheral growth of the mass is likewise invasive. Tumors of the upper lobe are prone to extend into the upper thoracic aperture or into the chest wall. In general, metastasis occurs late and even then not as extensively as from small cell carcinoma or adenocarcinoma. In contrast to these two types, the squamous cell tumor exhibits cavitations in more than 50 per cent of cases observed at autopsy. It usually connects with the involved bronchus and it occupies the center of the peripheral tumor mass.

Moore,[30] in describing the micrscopic pictures of the various forms, stated that the individual tumor cells of the small cell carcinoma, frequently called oat cell carcinoma, may be either round or spindle-shaped and are collected into small or large masses. These masses are completely devoid of reticulin fibers, which establishes the tumor as a carcinoma and not a sarcoma. Adenocarcinomatous cells are cuboidal or low columnar and are arranged for the most part in an acinic form. The cells of squamous cell carcinoma are polygonal, show intercellular bridges, and are frequently arranged in whorls, some of which are keratinized to form the characteristic epithelial pearl.

All of the elements of the lung not invaded by tumor growth are damaged secondarily. Obstructive atelectasis and emphysema occur as a result of partially and eventually complete occlusion of the bronchus. In many cases atelectasis is an early sign pointing to the presence of bronchial occlusion. It is often complicated by infection, with abscess formation and bronchiectasis. Damage to the bronchi, consisting of degenerative and metaplastic changes of the mucous membrane and an organizing type of pneumonitis, may cause obliterating bronchitis and bronchiolitis. Other pulmonary complications are localized pneumonic infiltration, effusion, empyema, gangrene, and hemorrhage due to erosion of blood vessels.

METASTASIS

Metastasis from primary carcinoma occurs by direct extension, lymphatic spread to regional lymph nodes and hematogenous spread to distant organs. Owing to the richness of the pulmonary curculation, dissemination in the blood takes place relatively early, and metastases occur in widely separated regions of the body. Lumsden[31] described an additional mode of metastasis, "bronchial embolism," a surface spread that may explain peripheral involvement of the lung when the primary lesion is proximal. Metastases from primary carcinoma of the lung are frequently multiple, and their distribution is wide. Table 2 shows the distribution of metastases in the present group of cases.

TABLE 2.—*Distribution of Metastases in a Series of 16 Cases*

Organ	Number	Per Cent
Hilar lymph nodes	14	87.5
Adrenal glands	7	43.75
Pleura	6	37.5
Liver	5	31.25
Peribronchial lymph nodes	4	25
Kidneys	4	25
Brain	3	18.75
Skeleton	2	12.5
Contralateral lung	2	12.5
Heart and pericardium	1	6.25
Spleen	1	6.25
Mesentery	1	6.25
Cervical lymph nodes	1	6.25
Abdominal lymph nodes	1	6.25
Skin	1	6.25
Pancreas	1	6.25
Thyroid	1	6.25

In 2,579 cases collected from the literature, Ochsner and DeBakey[32] observed metastases to the regional lymph nodes in 75.9 per cent; to the liver, in 34.4 per cent; to the bones, in 20.4 per cent to the adrenal glands, in 17.4 per cent; to the kidneys, in 16 per cent; to the heart and pericardium, in 10 per cent, and to the pancreas, in 5.1 per cent. As was to be expected, the regional hilar lymph nodes were most frequently involved. Frissel and Knox[26] observed metastases invading the hilar lymph nodes in 97.4 per cent of cases. Boyd[33] stated that the natural history of the disease as shown by distant spread my be so characteristic as to suggest the correct diagnosis. The six most common sites of metastasis are the lymph nodes, the liver, the brain, the bones, the adrenal glands and the kidneys. When an adult is seen at autopsy to have tumors of the lung, brain and adrenal glands, a diagnosis of bronchogenic carcinoma may be made. In Boyd's experience, 50 per cent of adrenal secondary carcinomas have a pulmonary origin, the other 50 per cent including every other site of primary carcinoma.

SYMPTOMS

Unfortunately, the onset of primary carcinoma of the lung is insidious in most cases. Manifestation of the disease is chiefly respiratory or due to extrapleural disturbances resulting from metastases, or the tumor may remain silent until it has reached an advanced stage. In about 98 per cent of cases the symptoms are referable to the chest.[34] A cough is the earliest manifestation. It may be productive or nonproductive. It is often regarded lightly by both patient and physician because of its frequency in other chest conditions. If it is productive, the gross appearance of the sputum is not characteristic, but not infrequently the sputum is streaked with blood. Bright red blood in small quantities may be noted, but large hemoptyses are rare. A wheezing sound on one side of the chest may be noted by the patient. This is due to partial occlusion of the bronchus and may disappear when the occlusion becomes complete. Too often a wheeze accompanied by cough and dyspnea is mistaken for asthma. Pain may be insignificant in the early stages, but later, in the moderate and advanced phases, it will occur. It has been described as persistent, sharp and stabbing and is due to involvement of the pleura, both as pleuritis and as metastatic involvement. The position of the tumor, rather than its size, accounts for its role in the causation of dyspnea. This may be due to a large pleural effusion, massive atelectasis due to the plugging of a large bronchus or interference with respiration and circulation due to obstructive growth of the tumor circumferentially around the bronchi and blood vessels.

Cyanosis may appear in a fair percentage of cases. Its occurrence depends largely upon the topography of the tumor, not alone upon its size. Pressure on the vena cava aggravates this cyanosis. Fever is observed in a fairly large proportion of cases and tends to be of a low grade early in the disease. Later on when bronchiectasis, secondary infection of cavities or pulmonary gangrene supervenes, high temperatures may be reached. Loss of weight is not a prominent symptom and does not appear until the disease has reached a late stage. When it occurs, it is not as pronounced as with cancer of the gastrointestinal tract. Pleural effusion is more common in tumor of the lower lobe than in involvement of the upper lobe. It occurs because of pleural metastases or collapse of the lung due to bronchial occlusion. Table 3 lists the symptoms noted in this group of 16 cases.

TABLE 3.—*Distribution of Symptoms in a Series of 16 Cases*

Symptoms	Number	Per Cent
Persistent cough	13	81.3
Hemoptysis	3	18.7
Pain in the chest	10	62.5
Dyspnea	10	62.5
Cyanosis	5	31.3
Fever	11	68.7
Loss of weight	12	75.0
Pleural effusion	5	31.3

Because of the paucity of the symptoms, particularly in the early stages, and the insidious onset, many patients unfortunately are examined too late. The fault is partly the patient's own; frequently he explains his cough as due to smoking. Only too frequently the patient and even the physician do not consider the significance of a respiratory infection that does not clear up completely, and several months may elapse before proper studies are made. It can readily be seen from Table 4 that in the majority of the cases here reported too much time was permitted to elapse before diagnosis of bronchogenic carcinoma was made. In 87.5 per cent of these, the patients were first seen in a stage at which no help could be given them. Their symptoms at this time were those of advanced metastatic involvement. It is appalling, indeed, that 87.5 per cent of this small group were too far advanced for curative operation by the time they reached the hospital.

TABLE 4.—*Duration of Symptoms Prior to Seeking Medical Aid*

Time	Number	Per Cent
Under 3 months	4	25
Under 6 months	6	37.5
Under 9 months	3	18.75
Under 12 months	1	6.25
Over 12 months	2	12.5

DIAGNOSIS

The only hope of increasing the percentage of cure lies in early diagnosis. A good thorough work up should start with a complete history and, if necessary, end with an exploratory thoracotomy. No work-up is complete unless the examination is carried out to the point at which the diagnosis is certain beyond a doubt.[35] A well integrated plan is the first important step toward cure. This plan should include the following items:

1. *History.*—This may include a persistent cough, productive or nonproductive; "cigarette cough;" hemoptysis; dyspnea; chest pain and wheezing; previous attacks of pneumonia; grippe; loss of weight; weakness; or no complaints when examined for other reasons.

2. *Physical Signs.*—These may be minimal, unreliable or (often) absent. However, there may be signs of bronchial obstruction, with or without infection beyond the obstruction; signs of secondary lung infection; signs of pleural involvement, with or without effusion; unilateral wheezing, or signs of mediastinal pressure.

3. *Planned Roentgen Studies.*—The roentgenogram may show rounded lobulated or striated densities, shadows or masses; evidence of atelectasis of one lung, lobe or bronchopulmonary segment; evidence of bronchiectasis or abscess; displacement of the mediastinum. Roentgen studies [36] should include:

a. Posteroanterior lateral and oblique films routinely

b. Posteroanterior film, taken on inspiration and on expiration, to detect obstructive emphysema, paralyzed hemidiaphragm and impairment of mediastinal mobility

c. Bucky or overpenetrated film (for heavy densities and contiguous bone invasion)

d. Laminography (to delineate obstructive bronchus or cavitation)

e. Roentgenograms of hands and feet (for pulmonary osteoarthropathy)

f. Kymocardiography (to exclude pulsating aneurysms)

g. Mediastinography (air injection to outline upper anterior mediastinal tumors)

h. Angiocardiography (helpful in central para-aortic and paracardiac lesions simulating aneurysms)

i. Lipoidal instillations by means of a catheter (to outline bronchial tree and localize site of bronchial to lesion)

j. Induced pneumothorax (to differentiate intrapulmonary form extrapulmonary lesions)

4. *Fluoroscopic Examination.*—This is needed to detect early atelectasis, obstructive emphysema, aneurysms, fluid level and paradoxical movement of the diaphragm. A barium swallow is used to detect invasion of the esophagus.

5. *Bronchoscopic Examination.* — This should be performed in every case of undiagnosed chronic cough. Since the majority of primary tumors of the lung are situated in the large bronchi, they can be demonstrated and examined by biopsy if they occur in the primary and secondary bronchi. A more peripherally located tumor can sometimes be brought into view if collapse of the lung is brought about by preliminary pneumothorax. Norris,[37] in a study of 310 cases, observed that tumors of the right and left main bronchi yielded positive bronchoscopic results in 100 per cent of cases; the right and left lower bronchi yielded 88.6 and 86.4 per cent respectively; the right middle lobe bronchus 57 per cent, and the right and left upper bronchi 58.7 and 32.6 per cent respectively. Betts[38] showed that, in a series of 62 cases of histologically verified pulmonary neoplasm, the lesion was seen and a positive preoperative diagnosis made in 74 percent of cases. It may be concluded that the most reliable method of diagnosis is bronchoscopic visualization of the tumor, permitting biopsy of the lesion. Bronchoscopic examination may also be helpful in determining operability, and bronchial secretions may be collected and stained for carcinomatous cells by the Papanicolaou technic. The efficacy of this method has been demonstrated by Farber and his associates,[39] who observed "positive" or suspicious cells in 69 of 414 patients. Pathologic confirmation of the diagnosis of carcinoma of the lung was established in 56 cases. Other investigators[40] have also demonstrated that examination of bronchial secretions is a valuable adjunct to the other means employed in making a diagnosis.

6. *Laboratory Observations.*—The blood picture is not characteristic, as bronchogenic carcinoma rarely causes anemia of any significance. Hochberg,[41] in studying a large number of cases, noted a relatively normal or slightly reduced hemoglobin content, with a corresponding change in the red blood cells. He also observed leukocytosis, with neutro-

philia and a rapid sedimentation rate

7 *Punch Biopsy*—Punch biopsy or needle aspiration may be done if the neoplasm extends to the periphery of the lung Unfortunately, implantation of the tumor cells may follow this procedure It is therefore justified only if consent for thoracoscopic examination or exploratory thoracotomy is denied

8 *Thoracoscopic Examination*—If adequate pleural space is created by institution of artificial pneumothorax it may be possible to determine the site, size and extent of the neoplasm

9 *Exploratory Thoracotomy*—If the aforementioned procedures fail to establish the diagnosis, one should not hesitate to do an exploratory thoracotomy, the mortality should be zero, and the information obtained is invaluable A centrally located rounded shadow or an atelectasis of a small bronchopulmonary segment caused by a carcinoma cannot be diagnosed in an operable stage unless exploration is done as early as possible

10 *Diagnostic Irradiation*—Occasionally a large mediastinal mass resembles a malignant lymphoma and is inaccessible to biopsy Roentgen irradiation may be used as a diagnostic measure to exclude Hodgkin's disease, lymphosarcoma and reticulum cell sarcoma, which regress rapidly

11 *Study of Pleural Fluid*—Demonstration of malignant cells in pleural fluid is of value only as a prognostic measure Usually it indicates late metastasis to the pleura except when, in a small number of cases, the primary lesion is peripherally located

DIFFERENTIAL DIAGNOSIS

Bronchogenic carcinoma notoriously masquerades as benign pulmonary disease The following conditions must be differentiated from pulmonary neoplasm

1 Pulmonary tuberculosis
2 Bronchial adenoma
3 Lung abscesses
4 Metastatic carcinoma
5 Primary atypical pneumonia
6 Mediastinal tumors
    a Lymphocytoma
    b Lymphatic leukemia
    c Lymphosarcoma
    d Hodgkin's disease
    e Reticulum cell sarcoma
    f Endothelioma
    g Fibrosarcoma
    h Melanosarcoma
    i Teratoma
    j Dermoid cysts
    k Chondroma
    l Fibroma
    m Lipoma
    n Osteoma
7 Pseudotumors
    Aneurysm
    Encapsulated fluid
8 Chronic suppurative lung disease
9 Thyroid and thymic tumors
10 Foreign body aspiration

REPORT OF TWO ILLUSTRATIVE CASES

Case 1—*History* A white man aged 57 was admitted to the hospital complaining of generalized aching pain in the right lower thoracic region aggravated by coughing He had apparently been well until four months earlier, at which time he had a chill accompanied with high fever This was diagnosed as pneumonia and was complicated by pleurisy He became afebrile and had a nonproductive cough His "pneumonia" recurred four weeks prior to his entering the hospital After this he noted that he had lost 7 pounds and had dyspnea on exertion He coughed constantly and noted frequent nocturnal perspiration, easy fatigability and weakness Roentgen examination revealed a homogenous shadow of increased density involving the lower half of the right side of the thorax Bronchoscopic examination revealed a lobulated tumor mass just below the orifice of the right upper lobe Pneumonectomy was performed, and the specimen showed a hard, firm tumor involving the hilar region of the right middle and lower lobes There was no evidence of metastasis

Comment—The patient's complaints, the roentgenographic data and the constitutional symptoms all pointed to the diagnosis of *bronchial obstruction* On two former occasions a diagnosis of pneumonia followed by pleurisy had been made The true diagnosis was *not achieved until bronchoscopic examination* revealed the actual nature of the disease This patient was the only one of the 16 in this group who was amenable to surgical intervention and who apparently has fully recovered, since he is alive and well after three years It was his good fortune that he had a slowly growing squamous cell carcinoma that had not yet metastasized.

Case 2.—*History:* A white woman aged 73 was admitted to the hospital complaining of pain in the right side of the chest, hemoptysis of three days' duration, constant cough, extreme anorexia, vomiting of three days' duration, loss of weight and moderate dyspnea. She had been admitted to another hospital three months before. At that time she had complained of anorexia, much gas and belching, nausea and cough. It was noted on physical examination that she had several "lumps" on her forehead and diminished breath sounds in the left side of the chest, with dullness in the lower half. A diagnosis of duodenal ulcer and chronic bronchitis was made, and the cysts on the forehead were surgically removed.

Physical examination on her admission to this hospital revealed dullness to percussion and decreased breath sounds over the entire left side of the chest. There was a mediastinal shift to the left. The patient died, and at autopsy it was seen that she had a primary adenocarcinoma of the left lung, arising from the superior lobe bronchus, with metastases to the right lung, the skull, the brain, the adrenals, the kidneys, the pancreas and the thyroid gland.

Comment.—This patient on her first admission to the hospital presented evidence of bronchial obstruction that was not considered at all, the diagnosis being "bronchitis" with emphasis on her gastric complaints and on surgical removal of cysts of the forehead. Undoubtedly this patient was beyond help even at the time of her original admission, but analysis of the case in retrospect fails to provide a plausible reason for the diagnoses of "duodenal ulcer" and "residual bronchitis." Her symptoms were those of metastatic manifestation of bronchogenic carcinoma.

TREATMENT

The only curative treatment of bronchogenic carcinoma is surgical extirpation. The method of choice is removal of the lung on the affected side, even though the lesion is apparently limited to one lobe. Only by pneumonectomy can the primary cause be adequately removed, since lobectomy does not permit adequate removal of the regional lymph nodes.

Contraindications to pneumonectomy may be divided into three classes: roentgenographic, bronchoscopic and clinical.

Roentgenograhic contraindications include (*a*) paralysis of the homolateral hemidiaphragm; (*b*) local invasion of contiguous ribs, spine, pleura and esophagus; (*c*) distant metastases to ribs, skull, pelvis and vertebrae; (*d*) metastases to the liver, demonstrated by nodulation of the outline of the right hemidiaphragm, and (*e*) bilateral mediastinal or tracheobronchial node extension.

Bronchoscopic contraindications include (*a*) invasion of the trachea by a tumor originating in the upper lobe or bronchus in such a way that the section would necessarily be made through tissue with neoplastic infiltration; (*b*) dilatation of the acute angle of the tracheal bifurcation, which becomes obtuse, indicating neoplastic infraction of the tracheobronchial lymph nodes, and (*c*) rigidity of the tracheal bifurcation and of the bronchial tree, and so-called "woody bronchus" characterized by absence of normal excursion of the trachea and bronchi during respiration.

Clinical contraindications include (*a*) general condition so poor as to render operation too hazardous: (*b*) metastases to other organs; (*c*) metastatic involvement of the axillary or cervical lymph nodes as verified by biopsy; (*d*) paralysis of a vocal cord; (*e*) Horner's syndrome; (*f*) diaphragmatic paralysis; (*g*) hemorrhagic pleural effusion; (*h*) metastases to the skeleton, and (*i*) hemorrhagic pericardial effusion.

The first successful total pneumonectomy for bronchogenic carcinoma was performed by Evarts A. Graham in 1933. The patient, who had a squamous cell carcinoma, is well today, almost sixteen years after the operation. Since then much greater interest has been taken in this condition, because prior to 1933 no successful treatment had been available.

In the last twelve years Ochsner, DeBakey and Dixon[12] have observed 412 patients with carcinoma of the lung. Surgical exploration was carried out in 246; of these, 147 were subjected to primary pulmonary resection. Of those with resectable tumors, 26 per cent survived. The rate of five-year cure was 8 per cent. Graham,[7] reporting on his Barnes Hospital series of 1,117 cases of bronchogenic carcinoma from July 1920 to July 1948, stated that only about 25 per cent of the patients had undergone pneumonectomy. In about 32 per cent exploration was done, but the cancer was too far advanced for resection of the lung. For the remaining 45 per cent operation was not possible either because the condition was obviously hopeless or the generally poor physical state of the patient precluded the chance of successful surgical treatment. Landskog[43] reporting on a series of 100 unselected primary bronchogenic carcinomas stated that the comprehensive picture of therapy is still a disappointing one and constitutes a challenge to further efforts. Sixty five of his patients were hopelessly advanced in the disease and absolutely inoperable. Surgical exploration was carried out in 32 cases and in 20 of these resection could not be done. Of the 12 patients who were submitted to resection (2 lobectomies) 25 per cent did not survive the immediate postoperative period. After two and one half to five and one half years, 3 of the patients had still survived. Gagnon[44] reporting on 508 patients seen at Toronto General Hospital from 1934 to 1945 recorded only 86 cases in which operation was performed. Of these resection was possible in only 49, with lobectomy done in 5. Eleven patients are still alive and apparently well, their survival ranging from seven months to eight and one half years. Waring[1] expressed pessimism as to the prognosis of carcinoma of the lung even when the diagnosis is made early and the surgeon is experienced, stating that at present five year cures following operation amount to no more than 5 per cent. In the group of 16 cases reported here treatment was possible in only 2. This consisted of pneumonectomy. One patient survives after three years. Of the remaining 15 survival from time of diagnosis to death is given in Table 5.

TABLE 5—*Interval Between Diagnosis and Death of Patient*

Time	Number	Per Cent
Under 3 months	8	0
Under 6 months	[illegible]	31 2
Under 9 months	1	6 2
Under 12 months	1	6.2

SUMMARY

The principal problem of improving results in cases of bronchogenic carcinoma is early diagnosis. Patients should come for help early enough to permit operation. The immediate postoperative mortality in the hands of skilled thoracic surgeons is now no more than that for major abdominal surgery. The medical profession must be educated to recognition of the frequency of this condition and the necessity of early, thorough examination, and the skilled services of clinicians, radiologists, bronchoscopists and surgeons must be coordinated for its prompt detection.

RESUME

La meilleure façon d'ameliorer les resultats dans les cas de carcinomes bronchogéniques est de faire un diagnostic précoce. Les malades doivent être soumis à un traitement suffisamment tôt pour permettre l'opération. Le taux de la mortalite post opératoire immédiate entre les mains de chirurgiens exercés n'est pas actuellement plus important que pour la chirurgie abdominale sérieuse. La profession médicale doit être éduquée à reconnaître la fréquence de cette maladie et la nécessité d'un diagnostic précoce. Afin d'assurer ce diagnostic précoce grâce à un examen complet on doit coordonner entre eux les services éminents que peuvent rendre les cliniciens, les radiologistes, les bronchoscopistes et les chirurgiens.

SUMARIO

El problema principal en la reduccion de la mortalidad en los canceres broncogenicos es el reconocimiento de dicha enfermedad en sus comienzos. La mortalidad en el periodo post operatorio inmediato, en manos del cirujano competente, hoy en dia no es mayor que la de la cirugia mayor del abdomen. La profesión médica debe de ser educada en el reconocimiento de esta enfermedad y en su importancia.

RIASSUNTO

Come al solito, il miglioramento nei risultati dei cancri bronchogeni dipende essenzialmente da una diagnosi precoce.

Il paziente dovrebbe consultare il medico

in tempo per permettere un'operazione radicale. L'immediata mortalita' postoperatoria nelle mani di abili specialisti del torace non dovrebbe ormai superare quella consecutiva ad operazioni addominali. I medici dovrebbero essere allenati nel riconoscere la necessita' di una diagnosi precoce: clinici, radiologi, broncoscopisti e chirurghi dovrebbero coordinare i loro sforzi per accertare la diagnosi.

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Case Report

Traumatic Arteriovenous Aneurysm Involving the Humeral Artery

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SAO PAULO, BRAZIL

AN interesting case of arteriovenous aneurysm of traumatic origin, involving the humeral artery, was observed in the hospital of the Santa Casa, in my own service

REPORT OF CASE

J D, a white Brazilian aged 26, a farmhand, was wounded by a shot from a 38 caliber revolver fired at a distance of about 13 yards (12 M) The bullet penetrated the left arm at the elbow, followed the humeral region in the longitudinal direction, and lodged itself in the region above the scapula on the same side, and underneath the skin It was removed the next day by a physician at the local hospital

The patient said that after the bullet struck him his arm was paralyzed and he could no longer raise it There was a slight hemorrhage but his general state was not severely affected by shock and he was able to walk to the hospital He remained several days, after which he returned home in an apparently satisfactory condition After a week at home he began to feel pains in the whole arm At the same time he noticed the growth of a tumor in the region of the middle third of the arm it increased rapidly in size and soon attained the diameter of an orange In addition to the tumor there was edema severe enough to deform the entire arm forearm and hand A few days later, as his condition grew worse, he was sent by his physician to Sao Paulo and admitted to the Hospital of Santa Casa

Examination revealed a cicatrix at the bullet s point of entry, on the inner side of the left elbow and another at the point of exit in the region of the upper edge of the scapula The arm badly swollen showed in the region of its middle third a large tumor that was hard virtually painless to pressure and without fluctuation expansion or thrill The radial pulse was present although filiform The forearm was paralyzed with numbness of the hand and fingers The temperature was normal The possibility of a phlegmon was out of the question, for the skin in spite of its distention was normal in color, and local pain was relatively slight The white blood cell count revealed no neutrophilia it was not, therefore, a case of inflammatory tumor In view of the traumatic nature of the wound, a diagnosis was made of traumatic aneurysm of the humeral artery Diagnosis of an aneurysm of the limbs is generally easy, since the pathognomonic symptoms—isochronism of pulsation, expansion

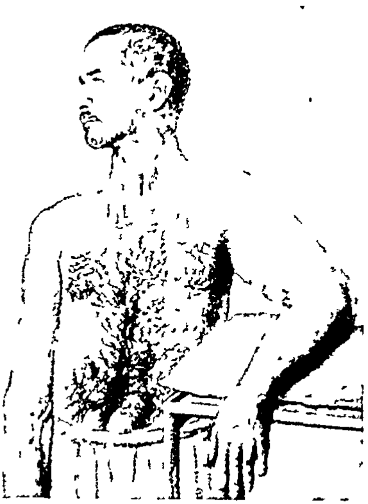

Fig 1 — Arm and forearm showing large swelling

and thrill—leave no doubt as to the nature of the lesion. In this case, however, these symptoms were wholly lacking.

There was observed on the inner side of the arm only a tumor without well defined limits, merging with the edema that affected the whole limb.

COMMENT

How can one explain the fact that so large an aneurysm of an important artery, located in a limited region, did not show the classic symptoms that permit a sure diagnosis? One must look to pathologic anatomy for the answer. The aneurysm is a lesion that develops slowly and is nearly always caused by arteritis of syphilitic origin. However, the arterial histologic elements, that is, the internal media and the external layers, react differently to the advent of the inflammatory process. According to the theory of Cormil and Rauvier, the elastic fibers of the media undergo a process of degeneration due to atrophy. The internal and external layers then become sclerotic and fibrous and, having lost their elasticity, are dilated under the force of the blood pressure. The external periarterial inflammatory process then causes adhesions to the neighboring organs, while internally the fibrin clots are deposited in stratified layers. These, increasing the internal resistance of the aneurysmal sac, permit its progressive dilatation without rupture. It is therefore the disappearance of the elastic medial layers of the artery that figures chiefly in the pathogenesis.

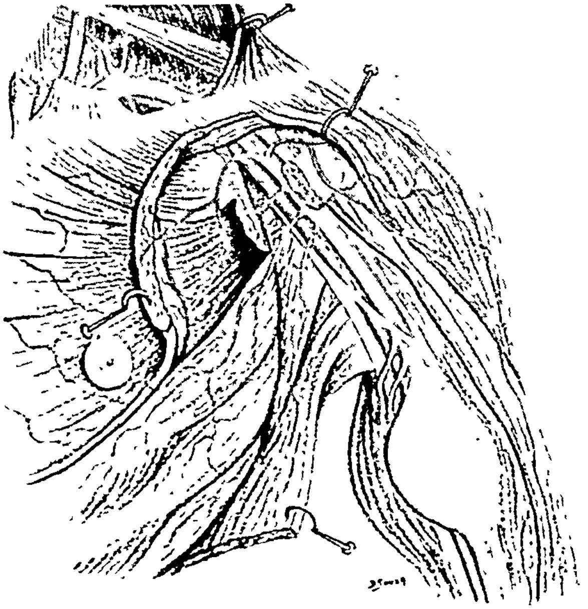

Fig. 2.—Drawing to show size and position of aneurysm located on middle part of arm.

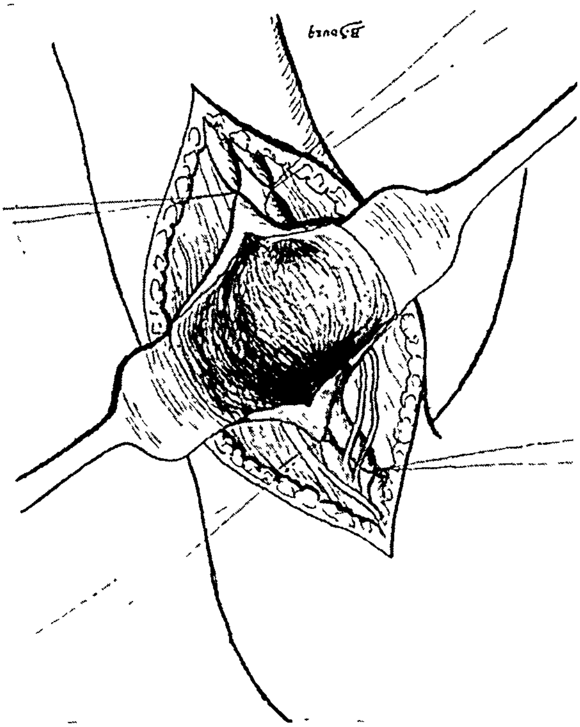

Fig. 3.—Incised aneurysm where arterial and venous blood mix. Ligature of the brachial vein and artery. Two collateral arteries are visible, which will provide nutrition for the limb after ligature of the great vessels.

This is what occurs in the usual cases. In the specific case here reported, however, the picture was quite different. Fifteen days after the patient was wounded the aneurysm was already fully developed, having reached the approximate diameter of an orange. The bullet, having gone through the arm in a longitudinal direction, passed between the humeral vein and the humeral artery, injuring them superficially (also longitudinally) so that no hemorrhage took place at the time. Soon afterwards, nature set up its defense; the artery and the vein adhered, forming a large blood sac in a remarkably short time—before the periarterial fibrous adhesions were organized, which, with the external resistance constantly stronger, permit the slow, progressive development of the lesion. The sac.

deprived of this artifice of nature, *broke prematurely*, forming a kind of large *hematoma* contained now by the aponeurosis and by the muscular masses of the region At the time of rupture the tumor increased greatly in size, and since the resistance of its capsule was replaced by the much weaker muscular resistance, the pathognomonic symptoms of aneurysm—expansion, pulsation and thrill—failed to appear Increased compression of the returning network of veins, due to the greater *expansion of the ruptured tumor, had yet* another consequence, the increase of edema along the whole limb, which sidetracked one still further and seriously hindered diagnosis

Under these circumstances according to Schwartz the following complications can arise infection and formation of an abscess next to the sac, gangrene of the limb due to compression of collateral vessels by the tumor, nervous disturbances such as partial or complete paralysis accompanied by extremely painful neuritis These phenomena according to Pierre Delbet result from compression and from the chronic inflammatory process that develops around the sac enfolding the nerve plexus with strong adhesions In the event of infection of the aneurysm states Jonselm Schwartz the diagnosis becomes so delicate a matter that the greatest practitioners have been deceived mistaking an aneurysm for a simple abscess He warns surgeons particularly to be suspicious of abscesses located along the important vessels and never to open them without being equipped with the necessary instruments for any eventuality The great error of opening an infected aneurysm taking it for an abscess has been committed many times In this case since the aneurysm grew rapidly, we purposely waited several days before operating so as to allow more time for increase in the diameter of the collaterals which would *have to guarantee the limb's nourishment after* ligature of the humeral artery

Experience has shown that the later the operation in cases of aneurysm the better will be the prognosis because once the total or partial stoppage of a large vessel is established and the pressure of the bloodstream is increased the elasticity of the collateral vessels and of the anastomoses commences to function

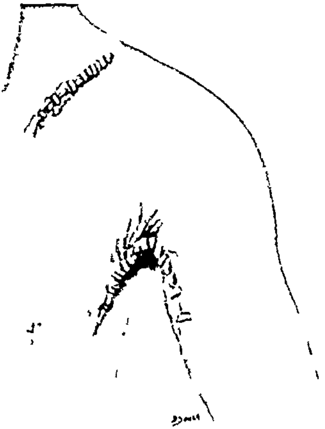

Fig 4—Site of provisional ligature (upper scar) of subclavian artery during operation

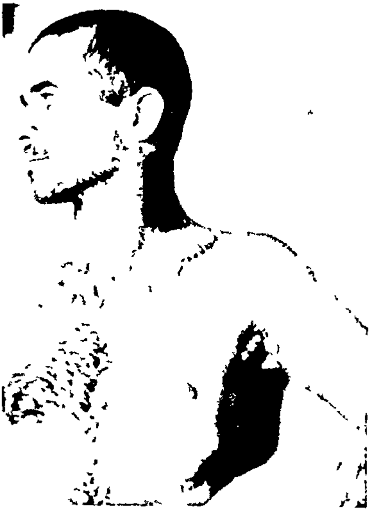

Fig —State of arm when clips were taken off increasing their diameter so as to permit passage of an adequate blood supply to the limb. We soon reached, however, the maximum length of time that we could wait; the volume of the tumor was increasing each day and threatening rupture through the skin. We therefore resolved to operate immediately. Owing to the great tension of the aneurysm, we took precautions against a surprise premature rupture of and a resultant hemorrhage, made, as the first stage of the operation, a provisional ligature of the subclavian artery just below the clavicular. This measure would not be necessary in a normal case, but here it was of inestimable service to us, for with this guarantee we could work freely, ligating the humeral artery at its upper end next to the tumor. We opened the large sac, and the rupture of the capsule of the aneurysm was immediately apparent. We removed the voluminous mass of clots and discovered communication between the sac of the aneurysm and the humeral vein, which was wide open for a distance of approximately 1¼ inches (3 cm.). We also tied the humeral vein, cleaned out the cavity of the sac, and closed it with drainage.

In such a case suture of the vein is often advisable. In this case it would have been impossible, not only because of the great length of the venous lesion but because of the anatomic status determined by the adhesions of the vein, artery and nervous plexus to the muscles of the region. Since the bullet followed the longitudinal axis of the arm, it injured not merely the large vessels, the humeral vein and artery, but the nervous plexus as well. Great uncertainty was felt about the result of the operation. Owing to the rapidity of the aneurysm's development and to the fact that operation would require ligature of the limb's two principal vessels, it was feared that gangrene of the arm would occur; that the collaterals, in only twenty-four days, had perhaps not had time to dilate sufficiently. And, in fact, on the first day after the operation the arm and forearm remained inert and cold, and the extremities of the fingers in particular gave the impression of complete ischemia. This state, however, proved to be transitory. On the following day, after treatment with sun lamps and injections of acetylcholine, the temperature soon reached a normal level.

As a rule the damaged circulation itself takes a long while to become reestablished, causing deforming and permanent edema; in this case it built itself up rapidly. The edema existing before the operation soon began to disappear, so that at the end of the week, when the stitches were taken out, the appearance of the arm was completely normal. Cicatrization also took place in a notably short time. Massage and diathermy resulted in great improvement, and the patient, on leaving the hospital, could move his arm. He was able to return to work at the end of two months.

RÉSUMÉ

On rapporte un cas d'aneurisme artério-véneux traumatique englobant l'artère humérale. L'auteur discute ce cas au point de vue idéologique et donne une description de l'opération employée qui eut un plein succès en dépit de son aspect défavorable.

SUMARIO

Se presenta un caso de aneurisma arterio-venoso de la arteria humeral de origen traumático. El autor discute el factor etiológico de este caso y describe la técnica operatoria utilizada. El resultado quirúrgico fué muy satisfactorio, no obstante el pronóstico desfavorable de estos casos.

RIASSUNTO

Riporta un caso di aneurisma artero-venoso di origine traumatica, interessante l'arteria omerale. Discure l'etiologia e la cura di questa complicazione. Nel caso operato dall'A. l'esito e' stato favorevole.

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Mr. Pepys in the Amphitheater

The famous diary of Samuel Pepys is perhaps as well and widely known as any classic in English literature It is less widely known that Mr Pepys was an enthusiastic patron of surgery, yet he was one of the founders of that august scientific body the Royal Society of Britain He was especially interested in early experiments with the transfusion of blood

> 'November 14 1666 Dr Croone told me that at the meeting at Gresham College tonight, which, it seems they now have every Wednesday again, there was a pretty experiment of the blood of one dog let out till he died, into the body of another on one side while all his own run out on the other side The first died upon the place The other very well and likely to do well This did give occasion to many pretty wishes as of the blood of a Quaker to be let into an Archbishop and such like, but Dr Croone says, it may, if it takes, be of mighty use to man's health for the amending of bad blood by borrowing from a better body '

A diary entry of the following year, 1667 speaks of a poor and debauched man' hired by the College (for twenty shillings) to have sheep's blood injected into his body "And it is to be done on Saturday next' adds Mr Pepys with relish one can almost see him rubbing his hands

Pepys has been valued chiefly for his quaintness of expression and the naivete of his self revelations He deserves to be recognized also as that *rara avis* of his time a man who could be open minded about science

Editorial

A Matter of Life and Death

THE Greeks had a word for painless and peaceful death: Euthanasia. The euphony of the term has helped to make it a favorite of authors, for it is found in the writings of Thomas More, Bacon, Arbuthnot, Steele, De Quincey, Bailey, Hume, Burke, Jefferson, Carlyle, Disraeli, Macaulay, Lecky, Pope, Byron, *Dobell* and *John Davidson*. Formerly, indeed, poets and philosophers were more inclined to advocate euthanasia than were physicians, but of late certain members of the profession seem beguiled by specious arguments for easy death. More alarmingly still, there is a growing tendency on the part of the uninformed public to accept them. The danger lies in neglect of the corollary: An easy and painless death for the sufferer requires an active agent to mete it out.

Is medical science that agent? Can it be? By what authority? With what assurance of justice?

Medicine is not an exact science like mathematics. Patients have "miraculously" recovered when every rational hope was gone. Who among us has not witnessed cases of this kind? We cannot judge all human beings with the same measuring-rod. No scientist can define life. On what possible basis, then, may he presume to destroy it?

Let us give the euthanasia enthusiasts a demonstration. Let us walk with them down a ward filled with "incurables." On the medicine tray is the hypodermic syringe, filled with a death-dealing potion—for of course we are assuming that euthanasia is legal when there seems no hope of cure. Here in the first bed lies Ellen, seventeen. She is a pretty girl, and although she is hopelessly crippled with arthritis, her young life over, in the popular phrase, before it has begun, she is smiling. When life grows dull, Ellen fills the ward with a lilting Irish melody, a folk song of Hungary, or a tender love song from the "land of heather." Down at the other end of the ward lies old Granny McGee, whose legs are useless from ulcers, but who at the sound of Ellen's voice travels back to her girlhood days in the green meadows of Killarney. Shall we still that music and kill two birds with one stone? Well, not just yet, perhaps. We'll *think it over*.

We pass on to the bed of Mammy Cole, a Negress of the Old South, born of slave parents. Mammy will never rise from her bed of pain. This fact seems somehow to have escaped her notice. She holds a Bible in her horny black hands. "Praise de Lawd fer His goodness to us po' mizzable sinnahs!" she cries, and in still braver crescendo, "Hallelujah!" An illogical joy, perhaps. But is the world so full of delight that we can spare it?

Here is Nellie O'B——, who has inoperable cancer of the liver. There is no earthly hope for Nellie now. Nellie is the widow of a man who, in a drunken rage, murdered his best friend. Day after day the beads of the Rosary slip through the thin white fingers. She is praying for the peace of her husband's soul, for his final forgiveness. We are not in a position to know how long this may take. We have already reached for the syringe; we put it back.

Now meet Mrs. S——, the mother of five children. She does not know that she is soon to die, and probably after weeks of pain and unrest. But we have noted, here in the hospital, that some strong inner compulsion bids her be watchful, and guide and guard her children as never before. We have heard her admonish her sixteen-year-old daughter and her fourteen-year-old son to be thoughtful about the home and to take care of their younger brother and sisters. She bids them be mindful of Tippy, the family dog. The children listen solemnly and nod their heads. They will never forget what their mother tells them now, may she not have something still to tell them that they will need? As well interrupt a service at a shrine as break in upon what—if anything on earth deserves the name—is a sacred communion.

Our "incurable" patients themselves are our best *human arguments*. *Scientific arguments* however, *are not lacking*. *After all we can do* much to alleviate pain. Has the poppy lost its power in our day? Are there not dozens of drugs that bring restful sleep? Is medicine altogether helpless in its ceaseless warfare against the agony of consuming disease? The "deathbed agonies" of which we hear so much belong largely to fiction and the past.

Our opponents have no patience with this argument. Very well, we can give them two others that cannot be scouted. One is the fact that only by long and continuous observation can we learn the course and progress of disease. "Chronic cases" present a splendid field for study. Time permits us to make comparisons and observations coupled with a careful and prolonged effort to achieve a specific treatment and so bring the "incurable" disease into the category of the curable. For this reason alone the legalization of euthanasia would do away with our only true sources of enlightenment; concurring in it we should defeat our own purposes. In the second place, if euthanasia were the rule, the almost desperate attempt to solve the secret *sayings of cancer would disappear. Physicians would not feel the same* urge to battle all diseases that bring upon their victims the slow, creeping agony of delayed death. The way out would be too easy. We should lose our vision and with it our passion for healing and soon our power. It were wise to remember two sayings of the past: "Without vision the people perish" and "Nothing of value was ever achieved without passion."

Yes, the Greeks had a word for the easy way out of this world. We owe a debt to the Greeks from Hippocrates down. That majestic language has fed and enriched our own. But this one word is all Greek to the true doctor. He cannot absorb it into his mother tongue.

MAX THOREK

This body in which we journey across the isthmus between the two oceans is not a private carriage, but an omnibus.—*Oliver Wendell Holmes*

Medicine is the only profession that labors incessantly to destroy the reason for its own existence.—*James Bryce*

Nothing is more estimable than a physician who, having studied it from his youth knows the properties of the human body, the diseases which assail it, the remedies which will benefit it, who exercises his art with caution, and pays equal attention to the rich and the poor.—*Voltaire*

New Horizons

By the Editor

Medicina Clerica

In 1642, when Sir Thomas Browne wrote his immortal treatise *Religio Medici*, nobody responded with a counter-treatise on medical lore as propounded by the ecclesiastic. This work might still be done by some patient historian with a taste for oddities. More than one eminent gentleman of the clergy has endeavored to conduct his own researches into the mysterious art of healing and the still more mysterious physical construction of man. It is well known among members of the profession that the Rev. Stephen Hales, a curate of the Church of England, was among the first to explore the nature of blood pressure. Mr. Hales, a doughty cleric not to be sidetracked by difficulties, actually performed his experiments on horses without benefit of anesthesia. His *Statical Essays* (1731) contain an account of these enterprises. His writing shows a genuinely scientific spirit.

In the contributions of other well known clergymen of former times—most of them, at least—there was more imagination than science. Bishop Berkeley, for instance, persistently recommended tar-water as a cure for almost every disease man is heir to. "It is of a nature so mild and benign and proportioned to the human constitution, as to warm without heating, to cheer but not inebriate." This quaint panacea was described and recommended energetically in the Bishop's book *Syrius*. John Wesley, the founder of Methodism, believed that doctors made use of high-sounding medical terms merely to confuse the patient and make him willing to pay their exorbitant fees; so he wrote his own medical guidebook, *Primitive Physick, or an Easy and Natural Method of Curing Most Diseases*, which states that the best treatment for cancer of the breast is a cold bath. "This cured Mrs. Bates of Leicestershire of a Cancer in her Breast, a Consumption, a Sciatica, and Rheumatism which she had near twenty Years.... She bathed daily for a month and drank only water."

It is to be noted in passing that to bathe every day for a month was then so unusual as to be considered an extreme theapeutic measure. Few of us realize, except when thus reminded, how very recent in the world's history is sanitation.

Nothing is more natural than that the shepherd of souls should interest himself also in the suffering of bodies, but medical science has long since grown too diverse, too complicated, for amateur participation, and hardly an amateur since Mary Baker Eddy has attempted it. Nowadays, when clergymen interest themselves professionally in the work of their medical brethren, it is likely to be in the psychiatric field. A sound knowledge of practical psychology and human motivations is a great aid to the conscientious pastor, and most such pastors fully realize not only its value but the danger that attends its improper use. Sigmund Freud, appalled by the manner in which his teaching had been distorted by the popular mind, remarked to someone shortly before he died, "Of course, you know I am not a Freudian." This same garbling of important discoveries and their implications not only results in many an individual tragedy but is a serious hindrance to the progress of legitimate psychiatric practice and research.

To the credit of the clergy today, however, be it duly acknowledged that psychologic and psychiatric principles as employed by most churches are used cautiously and well, and expert help is recommended when needed. Collaboration between the two professions on this basis is excellent, for medical men are realizing today as never before how intimate is the relation of body, mind and spirit, which are truly interdependent in sickness and health alike. It is hard to imagine a better field for cooperative endeavor.

A New Pathologic Entity

In these days of organized effort we are sometimes in grave danger of falling mentally and spiritually ill of a disease that is rapidly assuming epidemic proportions. This condition is the more serious because many do not recognize its pathologic nature. Though it is by no means asymptomatic, the symptoms are not painful—quite the reverse, in fact—and so may escape our notice till it is too late. We hear it referred to, almost reverently, as "group thinking."

Now actually there is no such thing as group thinking. Thought is a highly private and personal matter. In our present world situation it is necessary to organize: that is freely granted. But it is not necessary to neglect, as so many are doing, those solitary and unsuspected motions of the mind which call for our deepest and most respectful attention in solitude. All the great achievements of men down the ages have resulted from these visions, these discoveries, these lightning impulses and revelations. The prophet Moses was alone when he saw the burning bush. Archimedes was alone—and in his bath!—when he cried "Eureka!" Semmelweiss was alone and lonely when he made his epic discovery. So it has been and so it must be, for ever.

To speak of the "group thinking diathesis" is to coin a phrase, and none too good a phrase at that; but it is hard to avoid the contagion, since one of the main symptoms of the disorder itself is the coining of phrases and the excessive use thereof in endless repetition. When we hear ourselves speaking often of "getting down to the grass roots" or of making "blueprints for cooperation" let us pause to consider whether we mean what we say, or whether this language has been "caught" from others. The shibboleth is no substitute for thought. It cannot produce the new world all the old world is seeking. Nor can it give birth to great ideas and achievements.

The United States Chapter of the
International College of Surgeons

announces the creation of Junior Membership in the College. The House of Delegates,
meeting on Dec 18, 1949, established this new form of membership,
with the following requirements:

One year of internship in an approved hospital
One year as resident surgeon in a specific surgical training program

Applicants must be between 25 and 30 years of age. For further information, address

Secretary, International Board of Surgery

1516 Lake Shore Drive
Chicago 10, Ill

Chapter News

Memorial Honors Paid to De Las Casas

On Wednesday, February 15, 1950, the International College of Surgeons honored the memory of the late Professor Doctor Hernan De Las Casas, former world-wide authority on traumatic surgery and Dean of Medical Science at the University of Caracas, Venezuela. Prof. De Las Casas was killed in a plane crash in March 1947.

Many members of the Chicago medical community gathered at the College Home on Lake Shore Drive to attend the ceremony, which featured the unveiling and dedication of a bronze likeness of Prof. De Las Casas, executed by the noted sculptor, Prof. A. Montagutelli of Paris. Prof. Montagutelli was present and delivered the main address. Others who appeared on the memorial program were Father J. J. Clifford, S.J., of Mundelein, Illinois, who pronounced the invocation; Dr. Luis Alejandro Angulo of Caracas, a former pupil of De Las Casas, who made a formal presentation of the bronze likeness to the College, and Dr. Raymond W. McNealy, Chief Surgeon of Wesley Memorial Hospital, who responded with a speech of acceptance. The memorial bronze, a work of great distinction, was given a place of honor in the College library.

Left to right: General George Lull, Secretary General, American Medical Association; Prof. A. Montagutelli, Caracas and Paris; Dr. Harry M. Hedge, President, Illinois State Medical Society; Dr. Max Thorek, Secretary General, International College of Surgeons; Dr. Raymond W. McNealy, Chief Surgeon, Wesley Memorial Hospital, Chicago

The dedication ceremony was preceded by a banquet held in the Regency Room of the Drake Hotel, with Prof. Montagutelli as the guest of honor. To all those who attended, the occasion was memorable not only for its memorial significance but for the spirit of international fellowship and good will among surgeons that marked both the dedication ceremonies and the social gathering.

Brazilian Chapter Organizes

In September 1949, in Sao Paulo, the Brazilian Chapter of the International College of Surgeons was founded. The following officers were elected:

Prof. Carlos Gama, President; Dr. Jose Avelino Chaves, President-Elect; Dr. Sebastiao Hermeto, Jr., Vice-President; Dr. Virgilio Carvalho Pinto, Secretary; Dr. Jose Soares Batista, Second Secretary; Dr. Emilio Bianco Ribeiro, Treasurer; Dr. Oscar Cintra Gordinho, Second Treasurer.

Inauguration ceremonies were held in the Municipal Library Auditorium. Prof. Pedro de Calmon, Director of the University of Brazil, attended the launching of the new chapter as guest speaker. His congratulatory and inspirational address was warmly received. Prof. Calmon also distributed diplomas to the charter members. A banquet at Casa Anglo Brasileira next day concluded the event fittingly and enthusiastically, with a large attendance of surgeons and interested friends.

Finnish Chapter

A meeting of the Finnish Chapter was held in Helsinki on Jan. 29, 1950. Prof. Dr. Gosta Bohansson, F.I.C.S., of Orebro, Sweden, was an honored guest.

During 1949 there were three meetings of the Finnish Chapter, the first on January 29, the second on April 23, and the third on September 10. All were scientific sessions. The following papers were presented:

January 29—Methods of Determining Blood Circulation in Bipedicled Skin Tubes, by Dr. Atso I. Soivio.

April 23—The Role of Fibrous Tissues in Practical Surgery, by Prof. T. E. M. Kalima.

September 10—The Use of Curare in Connection with Anesthesia, by Dr. E. Turpeinen.

The Seventh International Assembly

of the

International College of Surgeons

Will Convene

at

Buenos Aires, Argentina

August 1-5, 1950

For travel information, write:

All Nations Travel Bureau

725 First National Bank Building 38 S. Dearborn St., Chicago

Official Travel Representatives, International College of Surgeons

New Books

Anus, Rectum, Sigmoid Colon: Diagnosis and Treatment. By Harry Ellicot Bacon, M.D., F.A.-C.S., F.I.C.S., F.A.P.S. Philadelphia: J. B. Lippincott Company, 1949. 2 vol. 3d ed.

Bacon's magnificent work on the anus, rectum and sigmoid colon, dedicated to the memory of his father, the late H. Augustus Bacon, Professor of Operative Surgery, Temple University Medical School, appears in its third edition completely revised and reset.

The field of proctology, always an important specialty, has been vastly enriched during the past few years. Important advances and discoveries were made during the recent war, particularly as to the value and importance of biochemophysiologic equilibrium in patients suffering from disease of the lower bowel. Dr. Bacon, with his customary keen awareness of the perpetually growing need for authoritative sources of information, has spared no pains to improve, enlarge, embellish and modernize a work whose earlier editions met with instant and enthusiastic acclaim on both sides of the Atlantic. He has secured and presented a great number of superb illustrations, many of them in full color. These, together with the excellence of the text, the generous lists of bibliographic references and the handsome format, make his two new volumes something more than merely impressive. This work has as much clinical value to the general practitioner as to the specialist, and as a source book and reference volume the specialist in proctology will find it indispensable.

Since all the material required resetting, it is obvious that no smallest part of it was neglected in revision. From beginning to end it is entirely up to date. New material has been added on the handling of megacolon and megarectum. Conditions of more frequent occurrence, such as the various types of fistula and pruritis ani, are examined in the light of recent etiologic and therapeutic knowledge.

The introduction of the sulfonamides, absorbable and nonabsorbable, and of the antibiotic agents, together with carefully recorded results of their use, has received careful attention. Evaluation of these new aids to proctologic surgery is still more or less tentative.

The relative value of colostomy and proctosigmoidectomy as operations for malignant disease of the lower bowel is discussed in an analytic study of 800 patients over a period of eight years. Dr. Bacon presents the facts without prejudice, explaining that his intention is to lay all the data before the professional reader and leave him to draw his own conclusions as to the method of choice in any particular case.

The sections on malignant disease of the anus, rectum and sigmoid colon are supplied with an unusually fine and varied collection of photographs and photomicrographs of tumor specimens. The histologic descriptions in the accompanying text are detailed and admirably written.

To the philosophic mind, the appearance of a really outstanding medical or surgical text is always more than the mere publication of a book. It represents, in permanent and visible form, a milestone on the invisible highway to truth. Turning over these pages, with their wealth of experience, technical knowledge and scientific accuracy made possible by countless factors never heard of until comparatively recent times, one thinks both reverently and ruefully of the great surgeons of the past, and of what they accomplished with almost no aids at all. Dr. Bacon's book is one of the works which prove that the spirit in which they lived and taught still prevails. For the progressive surgeon and student this work is indispensable.

Blood Transfusion. Edited by Geoffrey Keynes. Baltimore: The Williams and Wilkins Company, 1949. Pp. 574; 109 illustrations.

In 1668 the first whole book on the subject of blood transfusion—"a thin quarto volume of 80 pages"—was published in Bologna. Blood transfusion has come a long way since then. The editor of the present volume has brought together the correlated work of a distinguished group of British experts of wide experience in wartime as well as in peace. His personal contribution is a fine opening chapter on the history of this great therapeutic measure. Sections II and III, which concern the indications for blood transfusion and its complications, have been written by Dr. R. Bodley Scott of St. Bartholomew's Hospital. Sections IV and V, on blood groups, blood donors, and transfusions services, are the work of Dr. Hugh Francis Brewer, also of St. Bartholomew's. Mr. Anthony Till of the Radcliffe Infirmary at Oxford has written Section VI, which deals with the technic of transfusion and is followed by a treatise (Section VII) on blood transfusion in infancy, of which Dr. Richard W. B. Ellis of the University of Edinborough is the author. Sir Lionel Whitby of Cambridge contributes Section VIII, which deals with the storage and preservation of blood and its derivatives, and Dr. R. I. N. Greaves follows with Section IX, on blood derivatives and blood substitutes. Section X is again the work of Dr Brewer, who explains the organization of a hospital transfusion department

This aggregation of experience and talent results, quite naturally, in a very fine composite presentation The book has distinct value both as a text for study and as a reference One of its outstanding features is an immense bibliography

Diagnostic Synopsis of the Acute Surgical Abdomen By Bernard J Ficarra Springfield Ill Charles C Thomas, Publisher, 1949 54 pp 7 illustrations

The diagnosis of acute pathologic conditions of the abdomen including appendicitis pelvic disease, perforated peptic ulcer cholecystitis colonic lesions pancreatic disease, intestinal obstruction peritonitis trauma and physiologic disturbance, is capably dealt with in this monograph Dr Ficarra has made no attempt to cover the field in detail but he presents within brief compass an admirable analysis of the salient points His introductory chapter emphasizes clinical diagnostic signs and symptoms and the importance of the patient's clinical history The succeeding chapters apply the general principles of diagnosis to each of the types of abdominal disease listed above

The monograph, which had its origin in a series of lectures on emergency surgery of the abdomen is directed primarily to the service of the hospital surgical staff, particularly the interns It should serve this purpose to their entire satisfaction

Essentials of Orthopedics By Philip Wiles Philadelphia The Blakiston Company, 1949 Pp 486, 372 illustrations

As a textbook on orthopedics directed principally to the general practitioner, the undergraduate student and the graduate who is beginning his training as a surgeon, this book should serve an important purpose and need The author points out that orthopedics is still in its infancy and that a constant interchange of theories and new ideas is necessary to bring it to maturity He mentions the fact that a few major differences exist in the current practice of the United States and Britain and regards this as "a healthy sign of the mutual criticism that is not only tolerated but encouraged"

The opening chapter is concerned with postural defects congenital and acquired, the remainder of the book with specific pathologic conditions correctible or ameliorable by surgical intervention The etiologic basis the clinical symptoms, the diagnosis and the treatment of each lesion are discussed in turn Great emphasis is placed on the fact that in orthopedics much depends on the patient s steady cooperation Indeed Mr Wiles goes so far as to say that the operation is but an incident in the course of treatment This belief has not deterred him, however from presenting it thoroughly and with conscientious exactness

Recent Advances in Otolaryngology By R Scott Stevenson Philadelphia The Blakiston Company, 1949 2d ed Pp 395, 114 illustrations

Technically speaking Dr Stevenson s book is a revision but the changes and additions are so extensive that little of the former work remains it is therefore entitled to be judged on nearly the same basis as a new work Its avowed purpose is 'to stimulate the interest of medical practitioners in the problems and diseases of the ear nose and throat, and to bring to their notice recent advances in diagnosis and treatment'

The book strikes a modern note on its opening page for the initial chapter is devoted to chemotherapy and antibiotics in otolaryngology, especially as applied to Vincent s angina, disease of the nasal sinuses acute and chronic sinusitis masked mastoiditis osteomyelitis chronic suppurative otitis media and abscess of the brain Several of the succeeding chapters discuss tests and instruments from a thoroughly up to date point of view The operative technics of such prominent surgeons as Lempert, Sourdille and Popper are detailed Histopathologic studies are included Roentgen examination and treatment of cancer of the larynx are evaluated Cancer of the esophagus receives extended attention

The author has buttressed his work lavishly with references to other workers and investigators as well as with illustrations of outstanding quality This is a compact and highly useful book

The Science and Art of Joint Manipulation By James Mennell Philadelphia The Blakiston Company, 1949 210 pp 2d ed, vol 1 299 illustrations

This work deals in a general way with the manipulation, both manual and mechanical of the joints of the human body in the diagnosis and treatment of various injuries and diseases The author has had long experience in physical therapy His chapter on referred pain covering this ever present phenomenon as related to many different areas is particularly interesting The book is generously supplied with illustrative photographs roentgenograms line drawings and diagrams of corrective apparatus Volume 1 is concerned exclusively with the joints of the extremities

The author makes a noteworthy distinction between science and art as regards the manipulation of joints 'It is comparatively easy,' he observes 'to learn the science of joint manipulation but the technique of applying the art is by no means so simple [illegible] Prolonged practice is the only means of attaini [illegible] rfectio

Atlas [illegible] **Injuries** [illegible] illiam

H. Lyons and Barnes Woodhall. Philadelphia: W. B. Saunders Company, 1949.

In this new and very beautiful book, which is largely an outgrowth of World War II and appropriately dedicated to the men who suffered the injuries under discussion, neurologists and neurosurgeons will discover a wealth of up-to-date information on a subject that has been a little neglected. Pathologists also will be interested and stimulated by the authors' painstaking research into the histopathologic picture associated with injuries to the peripheral nerves, especially as a great many of the numerous fine illustrations are photomicrographic.

The material is handled under six main heads: (1) an introduction, dealing with the methods of fixing tissue for examination and the clinical material used; (2) a section on peripheral nerve structure; (3) a discussion of the pathologic picture attending completely severed nerves; (4) a chapter of traumatic nerve lesions in continuity; (5) a chapter on the technic of nerve suturing, and (6) a section on the autografting and homografting of nerves. A good bibliography and a cross-index of the book's contents complete the volume.

Since the book is so lavishly illustrated and so many of the illustrations are photomicrographs of tissue, full descriptive legends accompany each plate and necessarily occupy a great deal of space, but the textual material is not in any way neglected or overcondensed. The authors are continuing their studies and plan in two or three years to publish their later observations and conclusions. Meanwhile, the *Atlas* is a de luxe presentation both in content and in format, a handsome contribution indeed to surgical literature.

Thomas, Jones and Ridlon. By H. Winnett Orr. Springfield, Illinois: Charles C Thomas, Publisher, 1949.

This unusual and highly entertaining book, subtitled "On the Contributions of Hugh Owen Thomas of Liverpool, Sir Robert Jones of Liverpool and London, and John Ridlon, M. D., of New York and Chicago, to Modern Orthopedic Surgery," is an altogether pleasant and rewarding addition to the medical man's library. The work and personalities of three oustanding figures in surgical history are presented with an impartial, objective appraisal and with a conscientious effort to bring to light certain long-neglected facts, particularly those concerning Hugh Owen Thomas. Thomas, who spent most of his life in the midst of professional controversy, was a man of great energy, force and determination, although physically frail. His nephew, Sir Robert Jones, robust, urbane and charming, was in many ways his disciple, though perhaps less rigorous in his demands upon himself; according to Dr. Orr, this easier attitude was probably responsible for "concessions, both professional and personal, which Thomas would not have made." John Ridlon, an American surgeon, visited Thomas in England and was deeply impressed with the latter's ideas and methods, as well as with certain apparatus Thomas had devised. Out of this association came much of our present-day information about the value of rest in orthopedic treatment, as well as many practical devices for the preservation of function thereafter.

The book is highlighted by intimate and revealing anecdotes, bringing all three men to life before the reader's eyes. Personal revelations, professional arguments, and facets of personality as revealed by changing circumstances are cleverly interwoven. Of the three personalities, that of Thomas is the most picturesque and memorable, but there is no lack of interest in the other two.

The main portion of the book is supplemented with a paper by Arthur Steindler on "Ridlon and His Share in Moulding Orthopedic Surgery." Ridlon's contributions to the handling of tuberculous disease, infantile paralysis, scoliosis, etc., are discussed in some detail.

The book is illustrated with pen-and-ink-sketches of the three surgeons and line drawings depicting certain orthopedic apparatus. It contains an annotated bibliography of the orthopedic literature.

Surgical Management of Vascular Diseases. By Gerald H. Pratt. Philadelphia: Lea & Febiger, 1949. Pp. 496; 181 illustrations.

Basing his work on the conviction that "the most dramatic strides in the recognition and treatment of vascular diseases have occurred during the last decade," the author cites modern developments in intratracheal surgery, intratracheal anesthesia, etc., to substantiate this statement. He points out that many operations are performed today on the heart and the great vessels with excellent and sometimes spectacular results, although formerly these organs were considered practically unapproachable from the surgical point of view. Shunt technics, arterial resections and anastomoses, and electrothermal obliteration of aneurymsal sacs are cases in point.

The resulting book is a compendium of modern technic in the field of vascular surgery. Beginning with a comprehensive tabulation of vascular diseases and their respective nomenclatures, it deals successively with occlusive, vasospastic and circulatory syndromes, proceeding from these to a study of neurovascular disturbances and operations on the sympathetic nervous system. The choice of subjects to be illuminated by illustrations is excellent.

Abstracts from Current Literature

Development of Total Pneumonectomy. Nissen, R Am. J. Surg. 78:816, 1949.*

It is seventeen years since total pneumonectomy was first performed Technically the operation was far from perfect It was notable chiefly because it was a daring thing to attempt, requiring even more courage on the part of the patient than on that of the surgeon

I reported the case but published no follow-up The original technic has now, of course, become obsolete, but it may be of interest, historically at least, to record my experience, especially as only three previous attempts at total pneumonectomy had been reported, all of them unsuccessful

In 1921 I became associated with Sauerbruch At that time surgeons were hopeful that a method might be found, in connection with pulmonary resection, to prevent the occurrence of an operative pneumothorax It soon became apparent that success in these procedures required an obliterated pleura, since this rendered virtually harmless the reopening of the ligated bronchus Closure of the bronchus being the chief difficulty, separation of the bronchial stump was thought advisable, and it became a routine procedure to obliterate the pleural leaves before performing lobectomy. A great deal of anxiety and ingenuity went into the process. We closed the hilum of the lobe by encircling it with an elastic tourniquet or by mass-constricting ligatures and awaited sequestration of the tissue as a result of devascularization When this had occurred, the patent bronchial lumen discharged the bronchial contents into a well sequestered operative field The procedure was cumbersome, but the postoperative mortality rate for lobectomy fell to between 10 and 15 per cent

In 1929 a one-stage lobectomy in a free pleural space was reported by Harold Brunn. It was immediately realized, at least in the United States and Great Britain, that a considerable advance had been made, less perhaps because of the management of the hilum than because Brunn, wishing to prevent the occurrence of a bronchial fistula, established intercostal subaqueous drainage, thus securing removal of air and exudates and permitting expansion of the remaining lobe.

When confronted with the problem of total pneumonectomy, we were inclined to continue with the old technic, which had the value of successful experience, but it was soon apparent that the deeper problem was a matter of functional pathology Collapsotherapy and the surgery of traumatic lesions had already demonstrated that the entire lung could be defunctionalized without catastrophe, therefore our concern was not with the loss of respiratory surface involved in pneumonectomy but with the empty space that would be created by loss of the lung We compared the situation with that present in cases of agenesis of one lung, in which mediastinal shift, elevation of the diaphragm and shrinkage of the thoracic cage had provided effective compensation But one serious danger remained; the danger of pulmonary embolism resulting from sudden occlusion of the main branch of the pulmonary artery.

Experimental pneumonectomy had been successfully performed by Gluck and by Biondi on rabbits and dogs as far back as 1881 and 1882 These animals, however, do not react to massive pulmonary embolism as does man, and the reports of these successful experimental operations gave little account of the circulatory problem arising from occlusion of a principal artery and two veins. Their emphasis was rather upon compensatory filling of

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*Editor's Note In 1948, the late Secretary of the Historical Section of the American Medical Association, Dr J C Trent, arranged a program for the Annual Meeting of the American Medical Association, to which six physicians and surgeons were invited as speakers "who are active in the profession and have themselves contributed significant achievements of our time to the advancement of medical science"

The speakers and their topics were (1) W. J Mixter on "Intervertebral Disk"; (2) J R Paine on "Continuous Suction Drainage in Intestinal Obstruction", (3) T G Miller on "Intestinal Intubation"; (4) B Woodhall on "Peripheral Nerve Surgery", (5) E B Astwood on "Antithyroid Drugs," and (6) R Nissen on "The First Successful Total Pneumonectomy and Its Historical Significance" Dr. Nissen's paper was published in the December 1949 issue of the *American Journal of Surgery* under the title "Development of Total Pneumonectomy"

Although authoritative books on the history of medicine and surgery, such as A. Castiglioni's "A History of Medicine," C D Haagensen and W E B Lloyd's "A Hundred Years of Medicine" and Leonardo's "History of Surgery," present the facts correctly, the American surgeon hitherto has been under the impression that E A Graham's much publicized case was the first successful total pneumonectomy. Dr. Nissen's operation was performed two years before

The cuts illustrating this abstract are used by permission of the *American Journal of Surgery*

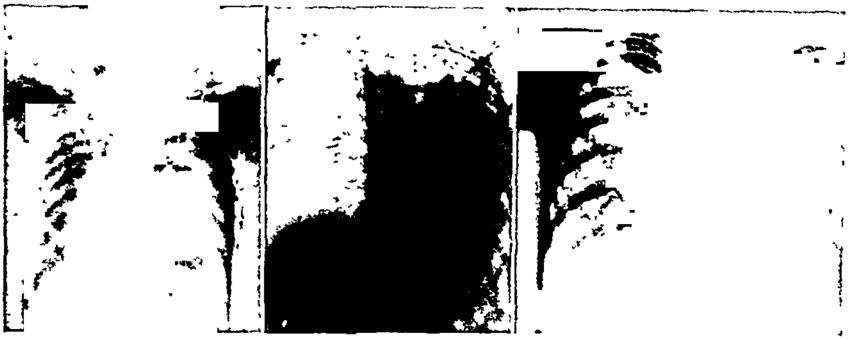

Fig. 1.—*Left,* roentgenogram taken on admission to hospital (Surgical University Hospital of the Charite, Berlin). Pressure pneumothorax on left side, with displacement of mediastinum; mediastinal and subcutaneous emphysema. *Center,* film taken in June 1931, after recovery from immediate consequences of injury. Note that there is bronchiectasis of entire left lung. *Right,* film taken six months after total pneumonectomy (July 21, 1931). Note retraction of mediastinum toward side operated on, extreme elevation of diaphragm and shrinking of left side of thoracic cage.

the empty space in the thorax by the remaining thoracic organs.

REPORT OF CASE

In July 1931, a girl 12 years old came into my service with severe emphysema of the mediastinum following a crushing thoracic trauma. An incision was immediately made in the neck, which resulted in the liberation of air. Tension pneumothorax indicated the possibility of a tear in the main bronchus of the left lung (Fig. 1, left). Empyema developed in the left pleura, and drainage was established.

For several months thereafter I observed the typical symptoms of chronic pulmonary suppuration. An abscess in the third intercostal space on the left, near the sternum, was drained, the wound communicating with the main bronchus of the left lung. Lipiodol was injected through the fistula and revealed that the entire lung was bronchiectatic (Fig. 1, *center*). The pulmonary suppuration was obviously referable to bronchostenosis caused by injury to the main bronchus. In spite of the fact that the patient's general condition left much to be desired, it was decided that the whole left lung should be extirpated.

The choice of operation lay between total pneumonectomy and multiple unilateral lobectomy. The latter operation had been made familiar by experience, but, since it would involve leaving a certain number of infected and dilated bronchi in the region of the hilum (because of the low level of dissection) it became evident that the risk of total pneumonectomy must be taken, with the provision that the tourniquet be placed on the hilum at as high a level as possible.

Paralysis of the left side of the diaphragm was induced, and an axillary resection of the third to the fifth rib was accomplished, with no difficulty in separating the lung in spite of the large adhesions. The pedicle of the lower lobe was successfully handled, but, in an attempt to isolate the upper lobe, strong traction on the hilum caused the patient's heart to stop beating temporarily. We discontinued the procedure at once and packed the wound. (I consider it extremely fortunate that this accident occurred before the tourniquet was applied, as otherwise it would have been thought due to occlusion of the blood vessels involved, whereas actually it was the result of a vagal reflex.)

Fourteen days later, on July 21, the second stage of the operation was carried out. By a peripheral approach the upper lobe was freed. When the entire lung had been separated, the hilum was constricted

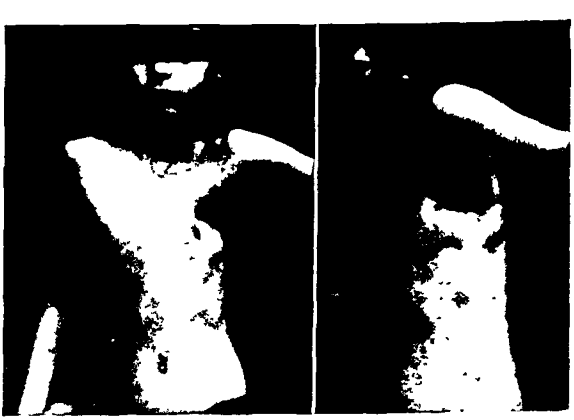

Fig. 2.—Photograph of same patient, March 1932. Left axillary incision leading to small fistula of left main bronchus is visible (*shortly afterward, this* fistula closed spontaneously).

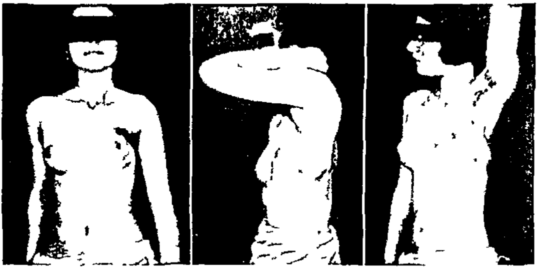

Fig. 3.—Patient in 1937, six years later.

by an elastic tube ligature at a point proximal to the bronchial obstruction. Additional ligatures (silk) were applied peripheral to the elastic one, and the lung was again packed about with gauze.

The patient's temperature reached 39 C. after the operation, and for approximately a week her pulse rate ranged from 140 to 160. There was a rapid decrease in size of the residual cavity, furthered by the rise of the diaphragm and the retraction of the mediastinum toward the operative side (Fig. 1, right). It was therefore unnecessary to perform a thoracoplastic collapse. Eight weeks later there remained only a small fistulous tract leading to the stump of the left main bronchus.

I presented this patient (Fig. 2) at the annual convention of the German Surgical Society on March 31, 1932, and Sauerbruch presented her again in April 1934. By this time spontaneous closure of the fistula had occurred. The latest photograph of this patient (Fig. 3) was taken in 1937, six years later. At this time she was in excellent condition generally, though with some signs of atrophy of the left side of the thorax, chiefly apparent in the unequal size of the breasts. I have had no news of this patient since World War II.

The remarkable feature of the second operation in this case was that no acute symptoms occurred as a result of mass ligation of the hilar vessels, not even vagal reflex. Although tachycardia persisted for about a week, no dyspnea was observed. Another feature, thought remarkable at the time but since discovered to be not unusual, was the fact that the empty side of the chest was filled by the remaining organs.

The second successful pneumonectomy was performed one and one half years later, by Cameron Haight. His patient was a girl aged 13 with diffuse bronchiectasis of the left lung. Essentially Haight followed the same technic, but he chose a different level of mass ligation. He ligated the two lobes separately and left more bronchial tissue. Stenosis

Fig. 4.—Cameron Haight's patient twelve years after total left pneumonectomy performed in 1932. (By permission of Dr. Haight.)

Fig. 5.—Patient of Evarts A. Graham, on whom total pneumonectomy was performed for bronchogenic carcinoma in 1933 (Graham, E. A.; Singer, J. J., and Ballon, H. C.: Surgical Diseases of the Chest. Philadelphia: Lea and Febiger, 1935.

of the main bronchus occurred as in my own case, but there were no undesirable sequelae attributable to the presence of two stumps. The patient is now married, has a child and is in excellent general condition (Fig. 4). She has had no symptoms referable to the lungs since her discharge from the hospital. She is the oldest living person in this country on whom total pneumonectomy has been performed.

In April 1933, Evarts A. Graham performed the third successful pneumonectomy, a one-stage procedure for carcinoma. The operation was a brilliant one and received much well-deserved publicity. The patient, a physician aged 48 (Fig. 5) at the time of writing is practicing his profession in good health, fifteen years after the operation.

Graham's great success was a partial realization of my own hope, and of Haight's, that bronchogenic carcinoma might eventually be successfully extirpated by this procedure. But, although in Graham's case the operation was successful, it must be pointed out that the leaving behind of a large intrapleural stump would obviate success in the majority of cases of carcinoma.

The real peak of significance in the development of this technic, particularly with regard to bronchogenic cancer, was Rienhoff's successful mediastinal dissection. He ligated the three main vessels individually and sutured the main bronchus. His operation for fibrosarcoma in a child aged 3½ years (July 1933) was a complete success and may be said to have marked the end of the experimental phase of pneumonectomy. At present, fifteen years later, few variations of his admirable technic have been suggested, since his method secures perfect hemostasis and allows measurably dependable closure of the bronchus, neither of which had been satisfactorily accomplished before.

The significance, therefore, of the first successful total pneumonectomy is that it may have demonstrated two points: first, that the human organism well tolerates sudden and permanent interruption of one-half of the pulmonary vascular supply, and second, that the empty space formerly occupied by the lung is quickly filled by the other lung's compensatory expansion and by spontaneous displacement of the heart and the diaphragm. These facts may have been of value in encouraging surgeons to modify and improve the technic.

Today, however, the operation has great practical value, for which the credit is due to Rienhoff. My own first total pneumonectomy, performed seventeen years ago, would probably never have been recorded in surgical history but for his modifications of the original technic.

Ocular Manifestations of Intracranial Injury. Bryson, J. G., Commander, M.C., N.S.N., *Military Surgeon* 104:348, 1949.

Intracranial injury has become increasingly frequent in the past few years. The automobile and the airplane have contributed predominantly to this trend, but industrial accidents and war injuries have also been frequent in the military area. Injuries to the head produce a number of changes in the eye and its adnexae, which are of great importance in determining the severity of cerebral damage, its location and extent, and its prognosis A review of the possible types of ocular involvement will assist in the performance of a more comprehensive examination and be an aid in the localization of cerebral pathologic change Examination should include a study of pupil size and reaction the motor nerves of the eye, other cranial nerves related to the eye the optic nerve, the visual pathways, the fundus changes and the conjugate eye movements The ocular sequelae of intracranial injury may include headache reading difficulties convergence difficulties photophobia nystagmus vertigo and contractions of the visual field

ROLAND I PRITIKIN

The Diagnosis of Lesions of the Stomach Patterson C O Wilson F W , Haley, A E , and Rouse M O *Southern M J* 42 19 29, 1949

The authors present a clinical study based upon 321 consecutive patients who had previously been carefully studied and sent to the authors with a diagnosis of serious gastric disease Of this group 33 5 per cent had normal stomachs, 20 per cent had malignant neoplasms of the stomach and 34 per cent had organic gastric disease other than ulcer or cancer

The authors present case histories to exemplify the various types of gastric pathology change They illustrate their observations with well prepared roentgenograms and gastroscopic drawings The correlation of clinical history, roentgen data, gastroscopic drawings and microphotographs furnishes excellent teaching material

The authors stress the importance of earlier diagnosis if effective surgical treatment is to be of value and they call particular attention to the fact that non neoplastic and nonulcerative disease of the stomach accounted for 34 per cent of all organic lesions observed It should be obvious that patients in this large group would benefit greatly by proper treatment when the exact diagnosis has been made

MEYER O CANTOR

Scirrhous Carcinoma of the Breast Kimble S F *M Ann District of Columbia* 28 136 1949

Metastases from scirrhous carcinoma of the breast may occur many years after removal of the original lesion Tumors that arise after previous radical removal of a breast cancer should create a suspicion of metastasis

The author describes a patient in whom a metastatic lesion was found eighteen years after surgical removal of the original lesion Examination revealed a rectal tumor but roentgen studies showed other metastases These metastases were described as representative of mammary carcinoma

The lesion in the rectum was a metastatic lesion from a carcinoma of the breast and there were diffuse metastases elsewhere

M T FRIEDELL

Primary Torsion of the Omentum in Children MacLean A B *Brit M J* 1 100 1950

Because the omentum in the child is usually short filmy and relatively fat free it is rarely involved in primary progressive torsion accompanied by symptoms of acute abdominal disease

An acceptable explanation for this rare development has not been advanced It is known that the omentum normally exhibits a purposeless movement which mobilizes its localizing properties to ward an intraperitoneal inflammatory process Payr s theory of hemodynamic torsion is intriguing but without proof

The condition merits discussion despite its rarity and the relative simplicity of treatment, i e , resection because failure of diagnosis even at operation will result when exploration of the upper part of the abdomen is omitted

When surgically neglected the twisted omentum with or without infarction will resolve and become fibrosed

THOMAS WILENSKY

Prevention and Relief of Stenosis of Lacrimal Duct Firestone C *Northwest Med* 48 111, 1949

An operative procedure is described for the prevention and relief of stenosis of the nasolacrimal duct Severance of this duct produces a sequel of epiphora which will plague the patient the rest of his natural life from a functional cosmetic and psychologic viewpoint

The eye and duct are anesthetized by topical anesthesia A No 3 lacrimal probe is inserted into the punctum then through the opening on the lacerated surface of the proximal portion of the torn lid and through the nasal ostium of the duct into the nose The probe is fixed by adhesive tape in a position in which it exercises minimal tension on the wound flaps that have been sutured The probe is left in position for seven days until healing is sufficient to assure against tissue shifting and resultant stenosis Ophthalmic ointment is applied and the eye occluded for the seven days unless indication for inspection of the eye presents itself

The same procedure is used in stenosis of the duct arising from diseases of the duct or sac or from duct adhesions of unknown origin The technic of repair has per cent effective

I M Wa

Bronchial Adenoma. Moersch, H. J., and McDonald J. R.: J.A.M.A. 142:299, 1950.

This paper is based on a review of data on 86 consecutive cases of bronchial adenoma treated at the Mayo Clinic. Forty-five of the patients were men and 41 women. Their ages varied from 15 to 67 years. The average duration of symptoms was thirty months. Six patients were asymptomatic. Seventy-four per cent presented significant roentgenographic pulmonary changes. Tomographic and bronchographic studies were of much value in diagnosis. The adenoma was visualized bronchoscopically in 91 per cent of the cases.

Ninety per cent of these tumors were of the carcinoid type and 10 per cent of the cylindroma type. Adenomas tend to protrude into the lumen of the bronchi. Frequently only a small portion of the tumor projects into the lumen, the greater portion being in the bronchial wall and adjacent pulmonary tissue. The mucosa is usually intact over the tumor. This explains the negative results of cytologic studies of the sputum and bronchial secretions. In 5 cases of this series there was proved metastasis.

Thirty-six of the patients were treated by endoscopic means. Nineteen are still living and have been followed for five to more than ten years. One of the 19 had a recurrence of the tumor and metastasis to the liver. Follow-up has not been complete on 5 of these 36 patients, but they had presented no evidence of recurrence as long as they could be followed, from less than three to ten years. Six of the patients subsequently had recurrence of the adenoma and later required surgical treatment. Five of these died within one year of the onset of treatment, and the other died twelve years later.

Forty-five of the patients were treated primarily by lobectomy or pneumonectomy, and 6 others underwent some type of operation secondary to previous endoscopic treatment. Three patients had surgical exploration only; 2 of these subsequently died. The other patient was later treated endoscopically with diathermy and implantation of radon seeds. This patient is living and well five years after treatment. Forty patients who had surgical treatment are living and well one to twelve years after treatment. Four died one to three years after surgical intervention, and 4 died at the time of operation.

Five of the 86 patients in this series were treated by roentgen therapy alone. Two are living and well fifteen and eighteen years after treatment; another is living fifteen years after treatment but having difficulty, and 2 died two and six years after treatment respectively.

In the author's experience the cylindroma type of adenoma does not respond as well to treatment as does the carcinoid type. Nine of this series had the cylindroma type. Three were treated endoscopically, and 2 died. Six were treated surgically, and 3 of these died later of the disease.

J. O. Morgan

Pruritus Ani. Rosser, C.: South. M. J. 43:1, 1950.

Proof that pruritus ani is a disease entity is seen in the histopathologic studies reported by several authors. A progressive process is described which resembles neurodermatitis, beginning with an exudative reaction of the skin and subcutaneous layers and ending in atrophy, leukocytic infiltration and multiple shallow epithelial ulcers.

The condition probably is not psychogenic in origin, but its incidence in persons under constant mental stress suggests that the disease may be intensified by mental factors.

The author discusses briefly irradiation of the involved skin, the injection of alcohol, the use of fungicidal drugs and the use of antihistaminic and antiparasitic agents. He expresses the opinion that one or more of these measures, together with the removal of definite anal lesions when present, offers relief when the condition is of moderate severity. However, many persons present themselves whose symptoms are intractable to these measures.

For more than two years the author has attempted to secure relief by a procedure based on the old undercutting operation. In 28 cases he has added to the undercutting operation the implantation of "gelfoam" sponges under the perineal skin, hoping that these sponges would act as a barrier to nerve regrowth. Twenty-five cases were followed. Three patients had complete relief for more than one year, 3 for more than six months and 5 for less than six months. Eight had complete relief followed by mild recurrence, and 6 had complete recurrence of the condition.

J. O. Morgan

Ocular Injuries in the Armed Forces. J.A.M.A. 142:151, 1950.

In World War I, ocular injuries amounted to 2.14 per cent of the total battle injuries. During World War II, approximately 2 per cent of battle injuries involved the eye, although about 6 per cent of the wounded had maxillofacial injuries. In approximately 80 per cent of cases of blindness the loss of vision could be traced to trauma. Adequate attention and training in safety precautions may have prevented many eye injuries. Proper attention to first aid measures together with early, adequate and specialized care is imperative to the successful preservation of sight.

Roland I. Pritikin

The Relief of Pain in Chronic (Calcareous) Pancreatitis by Sympathectomy

Ray, B S and Console, D A *Surg, Gynec & Obst* 89 1, 1949

After a review of procedures formerly used for the relief of intractable pain in chronic pancreatitis, 5 cases are reported, in which the patients were treated in New York Hospital by sympathectomy Total or partial pancreatectomy had been suggested for relief of pain but is formidable or even unfeasible as well as depriving the patient of secretions

Five possible pathways for pain fibers from the pancreas are discussed The recommended procedure is resection of the twelfth rib with the patient in the lateral position, the pleura being reflected and the crus of the diaphragm detached The great splanchnic is divided at the celiac ganglion and freed upward for 8 to 10 cm where it is again divided and removed The ganglionated chain is divided above the eleventh thoracic and below the first lumbar ganglion and removed The other side may be done at the same stage unless the patient's condition is especially precarious Unilateral operation may give temporary or partial relief

The recommended bilateral procedure may alter the blood pressure in normotensive persons, but after the initial postoperative postural hypotension there should be no untoward effect The visceral pain from such diseases as peptic ulcer, cholecystitis and appendicitis is eliminated but other symptoms and signs would still be present to give the physician as much warning as exists in some unsympathectomized patients with the same diseases Other gastrointestinal sexual and reproductive functions are not affected in either sex

The authors conclude that pain from the pancreas is mediated by nerves that traverse the celiac plexus the splanchnics and the sympathetic chains on both sides The vagus nerves play no part in transmission of pain from the pancreas The principal pathway is via the greater splanchnic nerves but the lesser splanchnic nerves the lower portion of the thoracic chains and possibly the upper portions of the lumbar chains may also serve as pathways

The minimal operation found to provide total analgesia of the pancreas and the one proposed as most suitable is bilateral resection of the chain from the eleventh thoracic to the first lumbar ganglion inclusive and of the lowest 8 cm of the greater splanchnic nerves although unilateral right or left resection may in some patients interrupt enough of the sensory supply to afford relief While the operation is well suited to the relief of pain in chronic pancreatitis it is of limited value for carcinoma of the pancreas chiefly because of the tendency of the disease to spread to pain sensitive areas supplied by somatic sensory nerves

W R Lovelace

The Indications and Technic of Foot Stabilization in Infantile Paralysis

Ritter, R O *Surg Clin North America* 29 269 1949

Serious deformities of the foot have long resisted adequate correction by such measures and devices as conservative manipulation tendon transplantation casts or braces The author states that the time to operate is after all return of muscle power has ceased

A medial and a lateral incision are generally advocated and through these careful removal of the cartilage and a minimum of bone is carried out The backward displacement of the foot and correct apposition to bone, with the foot in the neutral lateral position is essential The joints usually fused are the subastragaloid the astragaloscaphoid and the os calcis cuboid If need be the cuneiform joints and the joints between the internal cuneiform and the first metatarsal bones can be fused In extreme cavus deformity the entire scaphoid and head of the astragalus are taken out

If the anterior and posterior tibial muscles are paralyzed while the peroneus remains strong and active tendon transplantation may be used to overcome this defect The author utilizes the peroneus longus tendon as a dorsiflexor of the foot The routine procedure is described The peroneous longus tendon is incised at is lateral insertion It is then pulled up and out through another incision at about the junction of the middle and lower thirds of the outer lower part of the leg Then it is tunneled through to the medial aspect of the foot going down the sheath of the anterior tibial and out at its insertion It is anchored into a trapdoor groove in the internal cuneiform

If the calf muscles are paralyzed and the peronei and the anterior and posterior tibial muscles are active, the latter can be transplanted either singly or together into the tendons of the os calcis and the insertion into the tendon of Achilles and its insertion into the os calcis

A routine method of closure is advocated with great care not to allow any of the dressings to act as a constriction about the ankle after the plaster cast is applied and swelling sets in A well padded plaster cast is used applied up to the mid thigh with the knee moderately flexed and the ankle in the desired position Immobilization in the plaster cast is maintained for twelve weeks without weight bearing After this the cast can usually be taken off generally and an elastic bandage worn until the circulation is normal again

F L Jewett

Mesenteric Vascular Occlusion — A Diagnostic Surgical Problem. Nolan, J. O'L., and St. John, L. A., Connecticut State M. J. 14:1, 1950.

Mesenteric vascular occlusion may involve only a small segment of intestine or it may extend to massive involvement of the whole superior mesenteric blood supply leading to involvement of the small bowel and the right and transverse segments of the colon. There is no mechanical block, but the motility of the involved bowel is reduced to zero because of the anoxemic muscular paralysis. The superior mesenteric vessel is involved in 95 per cent of cases and may present an embolus or spontaneous thrombosis with equal frequency.

The outstanding symptom is agonizing abdominal pain, colicky at times and tending to be recurrent in its early stages. The pain later becomes steady but no less severe. Vomiting, largely reflex, is usually present. Melena is occasionally seen. Abdominal distention appears early, and signs of shock quickly manifest themselves.

Roentgen studies of the abdomen are of considerable diagnostic value. Areas of the small and large bowel affected by gas distention correspond in outline on the plain film to the anatomic distribution of the superior mesenteric vessels. Frequently the evidence of bowel distention is seen to end abruptly at the junction of the proximal two thirds and the distal third of the transverse segment of the colon. This may even be mistaken for mechanical obstruction of this part of the colon.

The authors feel that a careful consideration of the clinical picture plus prompt roentgen studies will lead to a higher percentage of early correct diagnoses and will offer the patients a greater hope of survival.

J. O. Morgan

The Stomach of the Recently Deceased. Williams, A. W.: Brit. M. J. 1:102, 1950.

The figures usually cited on the incidence of gastritis are derived from examination of resected specimens in which the presence of peptic ulceration or neoplasm invalidate their general applicability to population groups.

In an effort to standardize the histologic diagnosis of [illegible] gastritis and to obtain figures indicative [illegible] true incidence and severity in the general p[illegible] Williams examined 72 unselected stom[illegible] in formaldehyde by the Magnus technic[illegible]

Magnus [illegible] it autolysis begins in the adult within [illegible] forty-five minutes of death and that dir[illegible] tric injection of a fixative soon after death is necessary to exclude this factor from histopathologic observations.

Five histologic grades were developed from a detailed study of this material: Grade 1, normal; Grade 2, mild chronic gastritis; Grade 3, more severe chronic gastritis; Grade 4, severe chronic gastritis; Grade 5, very severe chronic gastritis. This is obviously a classification based on parenchymal changes accompanied by inflammatory cell infiltration, in which the lesser grades present considerable difficulties for accurate appraisal. The severe grades are characterized by "intestinalization" of the gastric mucosa, i.e., the appearance of Goblet cells and Paneth's cells. Williams describes "very severe" chronic gastritis as a greatly devastated mucosa with considerable degeneration, atrophy and disappearance of glands and often enormous stuffing of the stroma with chronic inflammatory cells.

Analysis of the necropsy specimens indicated that the severity of histologic lesions tended to increase with age. It has been known for some years that with increasing age there is a diminishing power of gastric secretion and that about 60 per cent of persons above the age of 60 have histamine-fast achlorhydria.

The author has not succeeded in establishing a convincing relation between gastritis and infection, although, like many previous reporters, he states that uremia was invariably accompanied by gastritis, often severe.

One or more ulcers were found in 15 per cent of the adult stomachs. Acute ulcers were present in 4 and chronic ulcers in 7 stomachs. The average age of the patients with ulcers was 67. In no instance had ulcer been diagnosed during life. Of 615 patients with peptic ulcer studied by Avery Jones (1947), two-thirds were male and 33 per cent were over 60. He called attention to the increasing age of the "ulcer population" and to the considerable rise in mortality among patients over 60 who have not had surgical relief.

The present review suggests that the increasing incidence of ulcers in elderly persons is related more to failure of general health than to local factors as indicated by the finding of extensive extragastric infection in 7 out of the 9 cases of gastric ulcer.

Erosions were observed in 18, or 30 per cent, of postnatal stomachs. These showed no physical or situational characteristics, and those without polymorphs were considered to be agonal erosions of vascular origin.

Thomas Wilensky

Armamentarium

Fat Absorption Accelerator Olothorb Capsules (Sharp & Dohme Philadelphia) contain a preparation alleged to speed up the absorption of fat in the small intestine Its active ingredient is polyoxethylene sorbitan monooleate, an emulsifying and wetting agent which, when mixed with foods aids in the emulsification of fats bringing about a more homogeneous mixture and thereby inducing more complete absorption of fats in patients with chronic disease of the gastrointestinal tract and patients who have undergone certain operations on the intestines Large amounts of this compound, say the manufacturers have been administered to patients over a period of months without the appearance of any toxic symptoms and with great benefit to their nutritional status Among the conditions in which Olothorb Capsules may be of service are ulcerative colitis, ileitis, nontropical sprue, celiac disease and pancreatic fibrosis After operations on the gastrointestinal tract the capsules should be of definite value in improving the nutritional status of patients who are unable to gain weight despite the administration of an adequate diet

This product is supplied in bottles of 100 and 1 000 capsules each capsule containing 0 5 Gm of the active medicament

Synthetic Cortisone The Glidden Company of Cleveland Ohio, has announced significant progress in its work with the synthesization of the rare cortisone (Kendall's Compound E) on the basis of soybean products The research staff of the Soya Products Division of this company has already synthesized several new hormonal compounds closely related to cortisone, one of which (Compound S) it is thought may prove an adequate substitute for the former in the treatment of rheumatoid arthritis The total chemical formula for Compound S differs from that of cortisone by only one oxygen atom The products are not yet on the market but arrangements have been completed to distribute the entire available supply to pharmaceutical manufacturers and clinicians including the U S Public Health Institute so that their possibilities may be tested and determined

Furacin Soluble Dressing New packaging of Furacin Soluble Dressing (N N R) in a 2 ounce collapsible tube is announced by Eaton Laboratories Inc of Norwich, New York This tube is in addition to the present packaging of the drug in 4 ounce 1 pound and 5 pound jars The dressing is an antibacterial preparation for topical application It contains 0 2 Furacin (brand of nitrofurazone N N R 5 nitro 2 furaldehyde semicarbazone) in a water soluble base It is a nitrofuran the powerful antibacterial activity of which was discovered at Eaton Laboratories in 1941 Furacin is the first of the nitrofurans to be made available to the medical profession, it is effective against many gram negative and gram positive organisms found in surface infections

Furacin Soluble Dressing is a yellow, water soluble ointment It is prescribed for the prophylaxis or treatment of infections of wounds severe burns cutaneous ulcers, pyodermas and skin grafts In addition to its availability as Furacin Soluble Dressing Furacin is supplied, on prescription as Furacin Solution (N N R), Furacin Anhydrous Ear Solution and Furacin Vaginal Suppositories

Locating Device The Guidoscope, an instrument offered by the Guidoscope Corporation of Sullivan Indiana is announced as an efficient aid to surgeons in the precise placing of various fixation devices One method of using the Guidoscope in pinning a fractured femoral neck makes only a small cutaneous incision necessary and the actual operation time is reduced to ten or fifteen minutes After the fracture has been reduced and the patient immobilized the Guidoscope is placed in position and its indicator suspended over the approximate location of the fixation device for the taking of anteroposterior and lateral roentgenograms On these films measurements are made to determine the magnification of the indicator and the fractured bones and also the relation of the indicator to the desired location of the fixation device The size of the fixation device is also determined The Guidoscope is then adjusted to the proper position and by the use of an adapter the fixation device is attached to the driver, a small incision is made and the fixation device is driven or screwed exactly to the predetermined position and location This instrument may also be used to locate and remove foreign bodies

Adjunct in Ulcer Therapy The National Drug Company of Philadelphia presents Resinat, an adsorbent for the neutralization of excess gastric acidity This agent, it is claimed does not cause constipation or produce acid rebound or other undesirable effects It is available in capsules (0 25 Gm tablets (0 5 Gm) and powder (1 Gm), and has been accepted by the Council on Pharmacy and Chemistry of the American Medical Association

In Memoriam

FRIEDRICH F. BERNHARD

M.D., F.I.C.S.

On December 9, 1949, Prof. Dr. Friedrich F. Bernhard of Giesen, Germany, a Founder Fellow of the German Chapter of the International College of Surgeons, died at the age of fifty-two years. Prof. Bernhard was a pupil of Prof. Poppert, after whose death he succeeded the latter as Director of the Surgical Clinic at the University of Giessen.

Prof. Bernhard made his most distinguished contributions to surgery in the fields of diseases of the biliary passage, serologic diagnosis of carcinoma and surgical treatment of the thorax. Much of his work was genuine pioneering. His research on the genesis of white bile, his critical evaluation of the diagnosis of carcinoma by examination of the blood and his insistence on active surgical intervention in cases of empyema, bullet wounds of the thorax and congenital cardiac disease were of the highest importance. His latest work of outstanding significance was his successful free transplantation of segments of the aorta (Gross) in *aortic coarctation.*

His remarkable scientific and analytic mind, his freedom from prejudice and his technical dexterity made him the artist and idealist that he was. His compassion for those entrusted to his care earned for him the respect and admiration of the entire surgical world. With other men of like vision, he helped to create the German Chapter of the International College of Surgeons. In the passing of Prof. Bernhard, both the German Chapter and the College as a whole have lost a scientist of notable accomplishments, a great humanitarian and a very great surgeon. A. Lezius, M.D.

Dr. Friedrich F. Bernhard

CARL GLENNIS ROBERTS

M.D., F.A.C.S., F.I.C.S.

Dr. Carl Glennis Roberts of Chicago, one of Chicago's most distinguished Negro physicians and surgeons, died of a heart attack on January 15, 1950. Dr. Roberts had been a resident of Chicago since 1906 and a practicing surgeon for thirty years before his retirement because of ill health in 1941. He was educated at Valparaiso University and the Chicago College of Medicine and Surgery. He was a member of the surgical staffs of several prominent Chicago hospitals, including the Chicago General Hospital, the Provident Hospital and St. Elizabeth's. He was active in civic, professional and sociological groups as well, and was known as a radio speaker and a contributor to medical and surgical journals.

Dr. Roberts was a member of the American Medical Association, the American College of Surgeons, the Illinois State and Chicago Medical Societies, the Cook County Physicians' Associations (life membership), the Medico-Chirurgical Society, Washington, D. C. (honorary life membership), the National Medical Association, and the Anatomical Demonstrators' Association of Chicago. He was also a Fellow of the International College of Surgeons and a Diplomate of the American Board of Surgery.

COLLEGE INTERNATIONAL DES CHIRURGIENS

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Max Thorek, The Man—An Appreciation

HERBERT ACUFF, M D, F A C S, F I C S
KNOXVILLE, TENNESSEE

THE name of Max Thorek is well and favorably known in almost every part of the world and signifies a surgeon, an author, a teacher, and an artist To those who know him intimately it signifies all this and more a man whose innate qualities make possible his achievements Could Max Thorek be divested of any or all of his special abilities, he would still be an outstanding personality, analytical, resourceful active capable of clear thinking and accurate evaluation He is endowed with a heart that beats for his fellow man that loves with devoted passion his family and friends and is vigilant to detect those who would betray his trust

He has an uncanny prevision of the future Long before the world at large took up the ideal of permanent peace and universal brotherhood, he took a great stride in that direction by founding the International College of Surgeons He continues his promulgation of the ideal through his activities in behalf of the College and through his editorship of its official journal He constantly recalls the many here and abroad who aided in the formative period of the College and continue to do so now His appreciation has no bounds

We therefore dedicate this issue of the *Journal of the International College of Surgeons* to our Founder Max Thorek in grateful acknowledgment and in affectionate recognition of his personal qualities It was my pleasant task to assemble the papers presented, a representative collection that should do him honor The response to my invitations was overwhelming Accompanying the articles were letters I shall quote from only a few

From Victor M Roman y Reyes, who is not only a surgeon but President of the Republic of Nicaragua, comes the message "As Founder of the International College of Surgeons Thorek deserves all distinction Never were honors bestowed with greater justice"

From Hans Finsterer of Vienna "My dear friend Max Thorek's good work as a surgeon his noteworthy scientific publications and his signally important work in founding the International College of Surgeons constitute a remarkable record in the career of one man"

Felix Mandl of Vienna states "Max Thorek has done more to cement friendly relations among surgeons than has any other man of my acquaintance He is a brilliant teacher a prodigious worker, and a devout student not only of medicine but of literature and music, his personality wins for him a hearty welcome wherever he goes . I count it a distinct honor to call him my friend"

McNeill Love [illegible] Cope of London sent [illegible] "Cope [illegible]

"Max Thorek for years has done wonderful work to promote cordial friendship and cooperation among surgeons of different countries. When I came to Chicago, he held out to me the hand of friendship and made me feel at home. Both by precept and by example, he has undoubtedly strengthened the bond of union among surgeons all over the world. May he live long to continue the good work." And Mr. Love: "I selected the subject for my contribution because twelve years ago, after reading Max Thorek's article on the technique of cholecystectomy, my colleague Hamilton Bailey and I adopted the technique he described and later reported 129 cases without mortality. . . . Not only in this field but in many others Max Thorek has introduced new methods and new ideas. Those of us who attended the Assembly in Rome could not but be impressed by the enthusiasm and desire for exchange of ideas among the hundreds of surgeons who attended. Such meetings must bear fruit in stimulating and expanding the knowledge of all concerned."

P. T. Crymble from Belfast writes: "The international importance of a surgeon is perhaps best seen from a distance. For many years the name Thorek has been familiar to us by reason of his surgical books and publications. Visit the local *Times* library and you will find his autobiography recommended. Our university library displays prominently his *Surgical Errors and Safeguards,* and his original gallbladder technique is a constant source of discussion at our meetings. . . . Meeting him in America, I was impressed by his marvelous grasp of detail."

France too adds her tribute through Mr. A. Plichet of Paris, Editor of *La Presse Medicale*: "In addition to his many fine works on surgery, his autobiography, *A Surgeon's World,* must be of great aid and comfort to struggling medical students during their hardest years. In this book he points out the intimate relation between surgery and psychiatry. . . . It is a pleasure to dedicate to him my researches on a certain form of epilepsy."

Max Thorek's *A Surgeon's World* led J. Bitschai of Alexandria, Egypt, to come to America. He writes: "Thorek has a knack of making friends. He knows well how to kindle enthusiasm and to keep it burning. May our College, his creation, continue to enjoy a long and useful life."

A. Lee McGregor of Johannesburg writes: "From far South Africa I extend a hand of greeting to Max Thorek and, through him, to the many leaders of surgery all over the world who by his great qualities have been knitted into a compact fellowship. The great ambition of Max Thorek's life has been to ease humanity's burden of pain and suffering. There can be nothing but admiration for such a man."

From Helsinki, Finland, comes the message of K. E. Kallio: "I am very happy to make a contribution . . . as an expression of the sincere gratitude and admiration I feel toward Dr. Max Thorek, the dynamic and genial leader of the International College of Surgeons."

From Barcelona, Spain, José Soler-Roig writes: "For years I had admired Dr. Thorek as a surgeon. . . . A few years ago, in Rome, I made his personal acquaintance, and since then he has honored me with his friendship. I have learned much from him . . . particularly the value of friendship and collaboration among members of the profession."

From Italy, R. Paolucci and E. Tosatti write jointly: "Shortness of time . . . prevents us from making an offering worthy of Max Thorek. We hope, however, that he will accept our modest offering with a feeling of kindness equal to the affection, consideration and esteem we hold for him."

The International College of Surgeons was not conceived, nor does it seek now, to replace or alter, in any sense, the many fine surgical organizations that exist on a national level. Rather, its goal is to keep pace with the international trend and to make of its members ambassadors of good will.

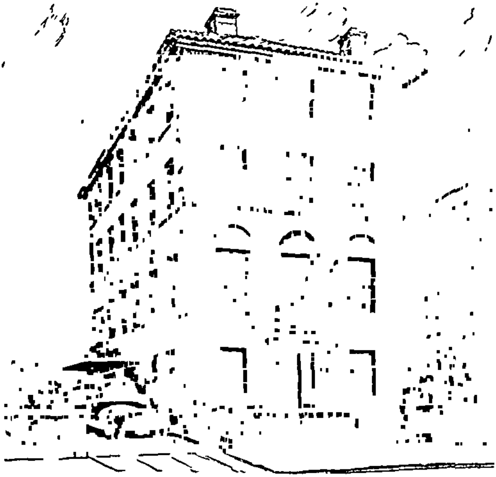
It has been my pleasant opportunity to have traveled with Dr. Thorek through many states of North America, in Mexico, in Central America, in South America, in Great Britain, in France, Germany and Austria, in Switzerland and Italy, attending meetings of the College. Everywhere he was cordially received. He is highly respected as a surgeon, an author and a linguist. So long as I live I shall treasure these experiences as among the richest of my life.

Dr. Thorek has an unusual sense of perspective. He thinks while others sleep; he works while others play Truly, things do not "just happen" to him; on the contrary, he *makes* them happen Better still, he has the knack of "making things make themselves," of bringing out the creative impulse in others

His eyes search for the good in men everywhere. He seeks to span the chasm of misunderstanding between men and organizations on the basis of the Golden Rule His philosophy of life is progress, reward by effort and sincere altruism

Among the many who have sent their tributes, André Crotti strikes a ringing note by saying: "I offer my modest contribution to the *Festschrift* honoring my friend and colleague, Max Thorek, of Chicago May he live long and strong."

I am indebted to Crotti for his designation of this issue of the *Journal* as a *Festschrift* That is just what it is: a warm, timely and genuine expression of the appreciation of generous-minded men toward contemporary distinction Dr Thorek is still in the full force of his career, conducting every day of his life a full calendar of surgical and organizational activities It is fitting that his altruistic philosophy of life, his achievements, and his dynamic talents be recognized now, for the laborer is worthy of his hire I can do no better than close my own sincere tribute with Dr Crotti's words, "May he live long and strong!"



Home of the International College of Surgeons
1516 Lake Shore Drive
Chicago

Max Thorek, the Surgeon

HENRY W. MEYERDING, B.S., M.S., M.D., F.A.C.S., F.I.C.S.
ROCHESTER, MINNESOTA

ENDOWED with a brilliant mind, unflagging energy, superior judgment and initiative and strong humanitarian inclinations, Max Thorek was inevitably destined to become an important figure in surgery. With such endowments, it was inevitable that he should become a leader, as well as a steadfast friend, trusted confidant and valued adviser of his associates. He is a linguist who commands many languages, a world traveler and lecturer, student and teacher, musician and collector of art and, in addition, a noted surgeon.

These attributes, as well as a rare ability to attract and perpetuate friendships throughout the world, combined to make him eminently fitted to found the International College of Surgeons. More than any other man, he advanced the growth and progress of this organization, not only by sacrificing his own time, energy and thought to it, but also by his happy faculty of obtaining and cherishing the powerful support of his associates who could provide practical, productive cooperation. It is therefore fitting and satisfying that his friends and associates should join now in creating a Founder's Issue of the *Journal of the International College of Surgeons* to do him honor.

Max Thorek has become a widely known personage, although he rose from most unpretentious beginnings. Two of his great-grandmothers were obstetricians. His mother was one of the first graduates in obstetrics of the University of Budapest. His father spent his life in the practice of medicine, and his grandfather on the maternal side was Dr. Maurice Kinstler, a physician of Boston, Massachusetts.

Max Thorek himself came to America penniless, at the age of nineteen years, and earned his education by playing the violin. He attended the University of Chicago and Rush Medical College, obtaining the degree of Doctor of Medicine in 1904. As time went on, he became attending surgeon at Cook County Hospital and professor of surgery in the Cook County Graduate School of Medicine, which he helped to found. His courses in surgery attracted surgeons from every state in the Union. In the past his personal courses for limited groups in operative technic, held in the American Hospital of Chicago, which he founded and of which he is chief surgeon, were attended by students from all parts of the world.

Dr. Thorek's extensive contributions to the literature need no special mention, for the *Quarterly Cumulative Index Medicus* reflects this work adequately. It can be said that there is scarcely a field in surgery to which he has not given his perceptive attention. His surgical texts are accepted as authoritative; they are found in scientific libraries throughout the world. His first work was a translation from the German of Krause's *Surgery of the Brain and Spinal Cord,* a three-volume English adaptation. His *Surgical Errors and Safeguards,* now in its fourth edition, has been translated into Spanish and Portuguese. His *Modern Surgical Technic* is recognized as a significant contribution to its particular field. This work, first published in three volumes in 1938, has passed through no less than eleven printings, and a special condensation was prepared for the use of our armed forces during World War II. His *Plastic Surgery of the Breast and Anterior Abdominal Wall* and *The Human Face in Health and Disease* have great professional value. Still another work from his versatile pen is his autobiography, *A Surgeon's World*—in several respects an unusual and exceedingly interesting book.

With so many qualifications for leadership and such a record of achievement, Dr. Thorek has been given scores of honors by his professional associates, not only those of his adopted land, but also those who respect and admire him in many other regions of the world He is an Officer of the Legion of Honor of France, a Knight of the Order of the Crown of Italy and a Commander of the Order of Saint Alexander of Bulgaria He has received the Distinguished Citizen's Medal of the Veterans of Foreign Wars of the United States, the Medal of Honor from the government of Venezuela the Presidential Medal of Honor from the government of Nicaragua the Order of the Sun from the government of Peru and the decoration of the Aztec Eagle from the Republic of Mexico To these have been added corresponding honors from various other national governments

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*Emeritus member, Section on Orthopedic Surgery, Mayo Clinic.

Dr Thorek's broad knowledge of the fundamental branches of medicine his understanding of surgical technic and his diagnostic acumen attract to his operating theater many surgeons from far distant lands as well as many in the United States His unusual ability to operate and to lecture before critical audiences has brought him both admiration and genuine esteem His contributions to the advancement of surgery in the form of conferences, lectures and the writing of papers and books in various languages have been important parts of his impressive success

He has always advocated the development of a united, friendly cooperative medical profession, absolutely without limitations as to race, creed or color His personality is highly effective, he is widely experienced and therefore uncommonly well equipped to stimulate friendlier relations among members of the medical profession and the people in general The broad humanitarian principles which he has always embraced and has been firm in enunciating have been accorded powerful support from many disparate quarters and have met with almost universal approbation

The world in which Dr Thorek now lives is profoundly different from the world in which Max Thorek the poor immigrant boy grew up He was brought to the friendly shores of America to escape persecution in his native land By determination strenuous efforts and almost incredible fortitude he availed himself of the educational opportunities in his adopted land eventually attaining such eminence as is but rarely conferred upon those who have the good fortune to have been born in the United States It is proper to say that today his name is well known and warmly regarded in medical circles of both hemispheres Not only in his chosen profession but in other fields too numerous to detail here, his indomitable spirit has led to constructive achievement of the first magnitude First last and always *he is a builder*

Great Moment

He pictured the scalpel He saw it enter the flesh of the cadaver It was shiny and clean He saw the knife after the dissection had gone on a little time It was foul looking corroded stained tarnished It was the cadaveric material

There was no other answer

He saw himself dissecting women They were dead of puerperal fever He felt his fingers wet with the pus and the fluids of putrefaction

A new light blinded him Now also the riddle of the clinics was solved The First Clinic had a higher death rate than the Second Clinic because in the Second Clinic there were only midwives And midwives did not do dissections

Ignatz Philipp Semmelweiss had discovered the cause of puerperal fever To end puerperal fever one simply washed one's hands A gray horror swept him He trembled thinking of the women he had killed No more must die There was no time to lose First he said to himself I must be honest He dipped his quill into the inkpot and began to write

—Morton Thompson· *The Cry and the Covenant* (Doubleday, 1949)

Scientific Articles

Mediastinal Cyst

Report of Twelve Cases

PROF. DR. R. PAOLUCCI, F.I.C.S. (HON.), AND E. TOSATTI, M.D.
ROME

ALTHOUGH in recent years the general conception of the genesis of mediastinal tumors has been greatly clarified, a satisfying classification of these tumors has not yet been offered. Some have discussed mediastinal cysts together with cystic or pseudocystic neoplasm; others exclude the cystic lymphangioma and nonembryogenic dermoid cysts; still others include intrathoracic goiters, thymic cysts and other cysts caused by degeneration of a neurinoma; finally, a real distinction between ectodermic and mesodermic cysts is not always observed.

The subject, in our opinion, may become clearer if a real distinction is made between congenital and acquired cysts of the mediastinum, excluding from the latter all cysts of the degenerative type (cysts of the thymus, thyroid, etc.) and of the neoplastic type (cystic tumor) and classifying the congenital cysts (according to Carlson, Happly, Hewer and particularly Biocca) as follows:

Congenital Cysts.—Cysts of exclusively ectodermic source are exceptional. In the anterior mediastinum, dermoid cysts of ectodermal and mesodermal origin are relatively frequent; at the time of writing, 250 cases have been described. Only exceptionally have these cysts occurred in the posterior mediastinal area.

Probably these congenital cysts are caused by bronchial organisms dragged into the thorax at the moment of the descent of the diaphragm and the heart (they may even come from the thymus). They have been distinguished by Duval and later by Hewer as follows: (1) laterothoracic, when in addition to the mediastinum they affect one of the hemithoraxes; (2) retrosternal, when they do not exceed the limit of the mediastinum; (3) cervical retrosternal, when they are situated at the base of the neck; and (4) mediastinothoracic, when in addition to the mediastinum they invade both hemithoraxes. These cysts are most often observed in young patients (15 to 30 years of age); they are generally oval and at times lobulated; their volume has been compared to that of a large lemon; their walls are generally formed by thickening of three more or less distinct layers. Elements of epidermis, of derma and of subcutaneous tissue, including cutaneous adnexae, fat and various other substances, are contained in their walls. Although often suppurating, adherent to the surrounding organs, necrotic, easily bleeding and sometimes subject to malignant metaplasia, they are not uncommonly asymptomatic.

The presence of the cyst in the mediastinum may be revealed accidentally by roentgen examination after a trauma or an intercurrent disease; less often, by a special kind of sputum (containing for instance, hair) and rarely by a typical mediastinal syndrome. Roentgen examination shows a round, nonpulsatile shadow with distinct limits (sometimes identified by calcified walls), frequently close to the hilium or the heart and quite commonly containing bony fragments or part of a tooth.

Cystic lymphangioma of the mediastinum, according to our experience, is much rarer than dermoid cyst. It is not a tumor but a congenital malformation of the lymphatic system. It occurs most frequently in the anterior part of the mediastinum; sometimes it

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From the Surgical Clinic of the University of Rome, Prof. Dr. R. Paolucci di Valmaggiore, Director.

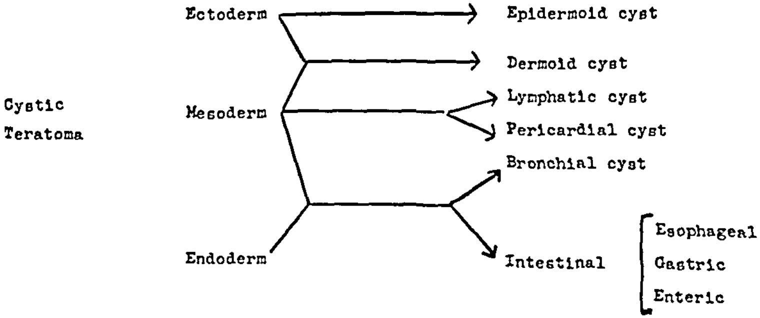
is primitive, and sometimes it represents a lengthening of hygroma of the neck. A thin wall covered with endothelium and a colorless (rarely xanthochromatic) substance are the normal constituents of the lymphatic cyst. Goetsch observed also in the walls of such cysts, fat vessels and nerves. In rare cases the lymphatic cyst is unilocular; more frequently, many cysts of various shape and volume are conglomerated and intercommunicating. Generally the cyst is asymptomatic. One case only has been reported in which the lymphatic cyst had given a frank mediastinal syndrome. On roentgen examination a light lobulated shadow of noticeable volume was perceptible. Differentiation of this lesion from other mediastinal cysts, from tumors of the thymus or from duplication of the esophagus is difficult unless one can inject a contrast substance into the cyst.

Mediastinal cyst of the pericardium implies by its name a clear topographic indication and a clear indication of its origin. The definitions in common use are not in our opinion sufficiently exact. Mediastinal cyst of the pericardium is of mere mesodermic origin, it can be clearly distinguished from the cystic lymphangioma and pericardial diverticulum. Its anatomic picture is quite clear. Its wall is thin and transparent, made up of connective tissue poor in elastic fibers. The wall's interior is covered with a carpet of flat endothelium. Very little proteid content and no mucin is present. The cyst is easily separable from near the surrounding tissues and this is a feature that distinguishes it from cystic lymphangioma.

Cysts of ectodermal and mesodermal origin (bronchial and intestinal) occur chiefly in the anterior mediastinum, they may reach conspicuous size and invade both hemithoraxes. Generally formed by a very thin connective wall lined with one or more layers of epithelium (ciliated in the bronchial cysts) their content is liquid, usually mucous, gluey, rarely limpid and often yellowish. They generally originate from anomalies in separation of the laryngotracheal channel though sometimes from small diverticula of the trachea, the bronchi or the esophagus. More often they have been observed near the bifurcation of the trachea, they may have a more or less manifest communication with the bronchial tree. In a case described by Heur the cyst was responsible for a serious mediastinal syndrome. Often they remain completely asymptomatic and represent an accidental discovery at roentgen examination or at autopsy.

Acquired Cyst —Leaving aside as has been suggested the degenerative and neoplastic cysts we shall now consider the acquired cyst, especially the parasitic type (echinococcus cyst).

The echinococcus cyst may be solitary or multiple, spherical or shaped like an hour glass. Its volume is variable and sometimes enormous. It suppurates easily and is easily perforated and calcification of its wall is not infrequent. Nevertheless it is often asympto-



matic; laboratory tests (Cassoni, Ghedini, Weinberg) may give negative results, and eosinophils may be absent. Bronchoscopic, bronchographic and mediastinographic studies afford no help in differential diagnosis. It follows that the echinococcus cyst cannot always be diagnosed preoperatively with assurance, and particularly difficult is its distinction from dermoid cyst. It may be of interest to remember that quite often this type of cyst, being in the proximity of the large vessels of the mediastinum, has been mistaken for aneurysm. Recently Kreuzer pointed out that echinococcus cysts, by compression on the pulmonary artery, have simulated the clinical picture of congenital stenosis of this vessel.

SURGICAL TECHNIC AND RESULTS

Since modern surgical technic permits one to create with ease and impunity a large opening of the pleural cavity, the old systems of aspiration, marsupialization, partial resection, etc., have been completely discarded, and total exeresis of the cyst in one stage has become the normal technic in the majority of cases. The jugular approach is limited to certain cysts located in the anterior mediastinum, and the paravertebral approach is only exceptionally followed.

Dermoid Cyst.—Two hundred and fifty cases are described in the literature, of which 150 have been carefully studied by Heuer (Bastianelli, Bauer, Budde, Crosby, Divis, Aurousseau, Dunkel, Eiselberg, Fanano, Francini, Gallavardin, Gianotti, Heuer, Slaviero, Sussi, Salsano, etc.) The respective statistics are eloquent; best results were obtained by total removal of the cysts:

Drainage: Mortality, 26.5%; recovery, 15%.

Partial resection: Mortality, 16.6%; recovery, 41%.

Total removal: Mortality, 10.8%; recovery, 89.3%.

If to the 76 cases collected by Heuer we add the 14 recent cases of Blades and his coworkers and our own 4 cases (in which all the patients recovered) the mortality rate goes down to 8.5 per cent and the recovery rate up to 91 per cent.

Cysts of Mesodermal and Endodermal Origin.—No more than 60 cases of these types of cyst are described in the literature, and all the patients underwent surgical treatment (Blades 23, Christian 12, Heuer and his coworkers 4, Sauerbruch 2, Ceccarelli 1, Fletcher 1, etc.). Here we may repeat what we have said about dermoid cyst, that the best results are obtained by total removal. Mediastinal cysts have been operated upon by the transpleural approach. Cysts of the cervicomediastinal variety have been treated by the same technic used for retrosternal goiter. Cases of this kind of cyst are certainly not frequent. "Easy" cases, in which a plane of cleavage has been found, have been described. Very difficult situations, in which the tumor joined in a single mass the esophagus, the trachea, and the phrenic and vagus nerves, resulting in a real tribulation for the surgeon, have also been reported.

Mediastinal Echinococcus Cysts.—Only 25 cases are referred to in the literature (Hare, Hoffman, Christian, Rose, Tosatti and Possi, Zilocchi, Paletto). We add now 7 cases in which we operated in a period of three years. All of the patients recovered perfectly. Three of the cysts occurred in the anterior and 4 in the posterior mediastinum. (Heuer reported 7 cases of hourglass echinococcus cyst of the mediastinum. In only 2 cases was operation performed, and in only 1 was a successful result obtained).

REPORT OF CASES

CASE 1. (*dermoid cyst*).—B. G. of Ferrara, a workman aged 33, had begun coughing six months previously, with a temperature ranging up to 38.5 C. and as much as 150 cc. of sputum a day. There was pain on the right dorsal aspect of the thorax, between the median and the posterior axillary line, over the third and fourth rib. Hypophonesis and vocal fremitus were increased, and some small rales were heard in the painful region. Roentgen examination showed a spherical mass in the upper half of the pulmonary field (Fig. 1, left). It was uniformly opaque and about the size of a large lemon, bearing in a large curve on the trachea.

Operation.—Anterior thoractomy was performed. The third and fourth ribs were resected between the parasternal and the posterior axillary line. The cyst having been identified and emptied by suction, it was observed that the posterior wall was fixed by some extremely tenacious inflammatory adhesions. The cyst was therefore removed, only its small adherent posterior portion being

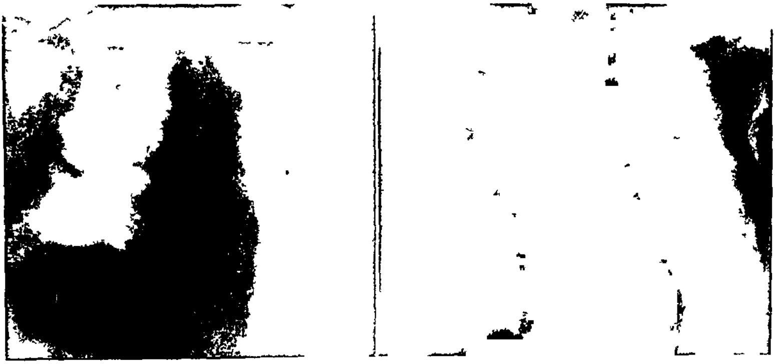


Fig 1 *(Case 1)*—Dermoid cyst of the anterior mediastinum *Left*, before operation, *right* after operation

left The contents were frankly purulent The fibrous wall of the cyst was decidedly thick

Microscopic Examination—The wall of the cyst was made up of connective tissue and lined with squamous epithelial cells Deep in the wall of the cyst were sebaceous glands hair follicles sweat glands and nests of leukocytes

The histologic diagnosis was dermoid suppurating cyst

Course—The postoperative course was uneventful, although cleansing and the closing of the residual cavity took some time (Fig 1 right) Finally a complete recovery was achieved

Case 2 (*dermoid cyst*)—B G of Cracovia (Poland), aged 36 had suffered from a harassing cough for two years One month before examination there had been fever with mucopurulent sputum, one week prior to examination the patient had ejected with her sputum a tuft of hair Hypophonesis and vocal fremitus were diminished rales could be auscultated all over the left hemithorax (Fig 2 left) Roentgen examination revealed a spherical shadow the size of a big orange with its limits not well defined joining medially with the anterior mediastinum The preoperative diagnosis was dermoid cyst of the anterior mediastinum suppurating and perforating into a bronchus

Operation—The fourth rib of the left hemithorax was removed between the parasternal and the posterior axillary line The pleural cavity was opened wide The left lung was anteriorly and laterally adherent to the thoracic wall and medially to the mediastinum The latter was occupied by an elastic mass Puncture of the mass yielded a few drops of purulent liquid Subtotal excision of the sac (the wall of which was thick and hard) showed it to contain some tenaciously entangled hair mixed with sebaceous and purulent liquid The residual cavity was drained Microscopic examination showed that the wall of the cyst was formed by very thick connective tissue and lined with a layer of cutaneous squamous epithelium Deep in the wall of the cyst all the cutaneous adnexae were noticeable

Course—Convalescence was uneventful Two months after the operation the drainage was removed Complete recovery was achieved (Fig 2, right)

Case 3—M G of Rome, aged 36 and apparently in perfect health was submitted to a routine medical examination before entering upon a governmental career Roentgen examination showed in the left hilomediastinal zone (Fig 3 left and center) a round shadow the size of a tennis ball, of uniform density and sharply limited Clinical examination gave absolutely negative results

Operation—A parasternal incision was made from the second rib down to the fourth rib in the left side A 3 cm segment was removed from the second and the third rib The pleural cavity was opened, and a round, pulsating bulk was observed in the anterior mediastinum Detachment of the upper part of the mass was particularly difficult, but the cyst was completely removed Macroscopic and microscopic observations resembled those in Cases 1 and 2 except that there was no suppuration

Course—The postoperative course was stormy for five days and uneventful thereafter Fever had disappeared by the twentieth day Two months

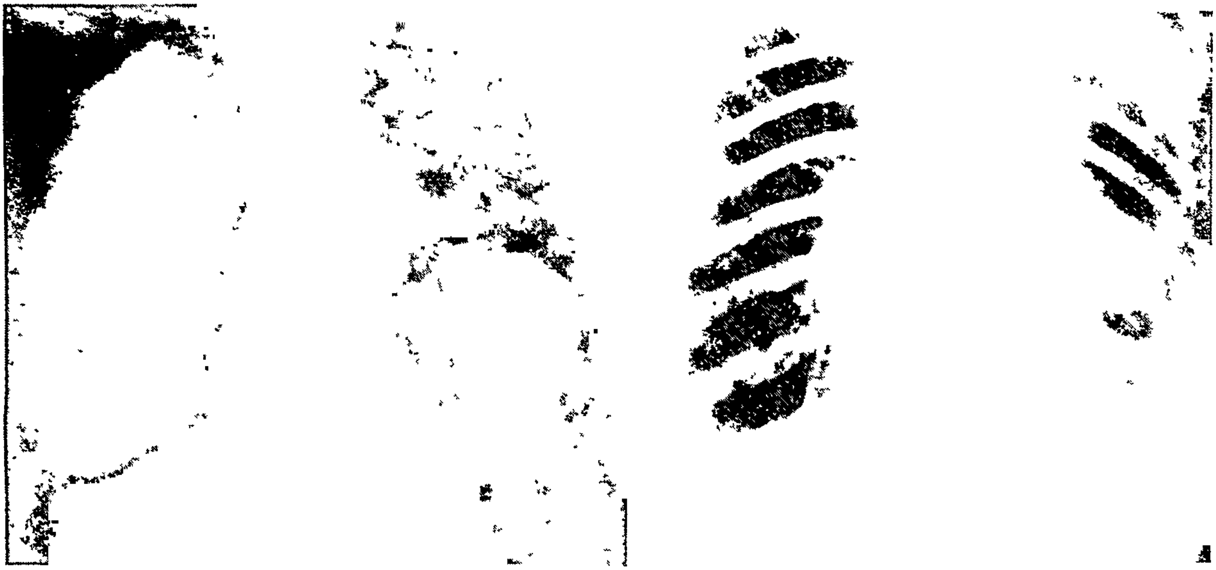


Fig. 2 (*Case 2*).—Dermoid cyst of the anterior mediastinum. *Left*, before operation; *right*, after operation.

after the operation the patient left the hospital entirely well (Fig. 3, right).

CASE 4.—G. G. of Cremona, a teacher aged 66, had noticed eight months previously a pain between e fourth and fifth ribs on the right axillary line. Two months later there were hematic sputum and dyspnea. Hippocratic fingers were noted. Pressure on the fourth, fifth and sixth ribs between the anterior and the posterior axillary line on the right was painful. Hypophonesis and vocal fremitus were increased; there were rales in the interscapular and paravertebral zones between the fourth and eighth ribs. Roentgen examination (Fig. 4, left and center) showed a clearly defined shadow in the upper third of the right anterior pulmonary field. The bulk was delimited inferiorly from an area of interlobar pleurisy. The second and third ribs on the right side were decalcified. The roentgen diagnosis was possible tumor of the mediastinal pleura.

Operation.—An incision was made along the third intercostal space, between the parasternal and the median axillary line. Through the large opening of the pleura a large mediastinal tumor was removed, together with large segments of the second, third and fourth ribs. The tumor was of unequal consistency. It was round, measuring 13 cm. in diameter. It contained a large suppurating cavity. Microscopic examinatio [illegible] ealed a squamous cell carcinoma implanted i [illegible] ermoid cyst.

Course.—The patient was t [illegible] n the fourteenth postoperative day and l [illegible] ital after ty-two days. A year and [illegible] the op- he was in good health ([illegible] t).

CASE 5 (*ectodermal cyst*).—B. M. of Bologna, aged 54, had suffered for many years from a harassing incurable cough. Blowing rales were heard all over the pulmonary field. Roentgen examination (Fig. 5, left and center) showed a large cystic shadow at the base of the right hemithorax, with a visible hydroaeric level. It extended medially into the posterior mediastinum and downward into the diaphragm and was neatly delimited by an opaque rim. Bronchographic study showed that the bronchioles were divaricated and encircled the cyst.

Operation.—Posterior thoracotomy was performed, with resection of the posterior tract of the fourth to the seventh ribs. Adhesive pleurisy was present. In the posterior mediastinum a large cavity was seen, containing mucous fluid. On thoracoscopic examination the wall of the cyst was seen to be smooth and vascular; there was no recognizable evidence of connection with the bronchial tree. A pleural pouch was suspected; after a week a phrenicoexeresis was effected, and after fifteen days a thoracoplastic operation was performed. At this operation the correct diagnosis was made and the whole wall of the cyst was removed. It consisted of two layers: an external membrane with connective tissue and numerous vessels, and an internal one made up of cylindric stratified epithelium with ciliated cells (definitive diagnosis, posterior mediastinal cyst of ectodermal origin). After the last operation the patient recovered completely. Gauze packing soaked with opaque substance shows the zone in which the cyst was located (Fig. 5, right).

CASE 6 (*parasitic cyst*).—L. N. of Rome, aged 27, complained of slight pain at base of the right hemithorax and frequent "sobbing" of two months' duration. One month prior to examination coughing had begun, with mucous and sometimes rusty sputum. Blowing rales were present all over the pulmonary field. The Cassoni reaction was positive. The blood count showed 2 per cent eosinophils. Roentgen examination showed a round homogeneous area of opacity, clearly delineated in the anterior mediastinum, jutting out into the right pulmonary field at the level of the hilum.

Operation.—An incision was made between the parasternal and the posterior axillary line in the seventh intercostal space. Tenacious interlobar adhesions extended to the pericardium and the mediastinum. The cyst had originated in the high anterior part of the mediastinum. Numerous adhesions between the mediastinal pleura and the lung were eliminated; this was followed by puncture of the cystic wall and by suction. The cystic membrane was completely removed. A small drain was placed in the pleural cavity. This was followed by suture of the thoracic wall.

Course.—The drain was removed after forty-eight hours. The patient was free of fever on the sixth day and is recovering.

CASE 7 (*parasitic cyst*).—D. G. G. of Eboli, aged 43, complained of coughing of two months' duration, with abundant expectoration, and a temperature up to 39 C. There was hypophonesis; vocal fremitus was diminished; small rales were heard in the apical zone of the left lung. The Cassoni reaction was negative. Roentgen examination showed a sharply limited spherical opaque area the size of a tennis ball in the anterior mediastinum, jutting out into the superior third of the left pulmonary field.

Operation.—An incision was made, following the third intercostal space. The parietal pleura was opened; an incision was then made in the mediastinal pleura. A spherical bulk the size of a tangerine, with a fluid content, was disclosed. Puncture of the mass yielded rocky water. The cystic wall was taken away by suction. The mediastinal pleura was sutured and the lung reexpanded. The diagnosis was echinococcus cyst of the anterior mediastinum.

Course.—The postoperative course was uneventful. The patient left the hospital fifteen days after the operation, fully recovered.

CASE 8.—B. G. of Rome, a worker aged 38, had had chronic bronchitis for several years. After a roentgen examination he was referred to our clinic. The subclavicular left zone jutted out more than did the opposite side. Vocal fremitus was abolished. There were local apnea and dullness. Posteriorly, at the same level, the clinical picture was exactly the same. On the right side there was hypophonesis between the fifth and the eighth rib. Blowing rales were noted all over the pulmonary field. Roentgen examination showed two large masses of homogeneous opacity coming from the mediastinum and extending to the thorax on both sides (Fig. 6, upper left and right). The one on the left was as large as the head of a newborn baby. The esophagus was displaced backward and showed strangulation at the level of the fifth and sixth thoracic ribs. The Cassoni reaction was positive. The leukocyte count showed 5 per cent eosinophils.

Operation.—A wide opening was made on the right parasternal line at the level of the second to the fourth rib. An elastic mass soon appeared. A small opening on the mass gave way to some small daughter cysts. The breach was enlarged.

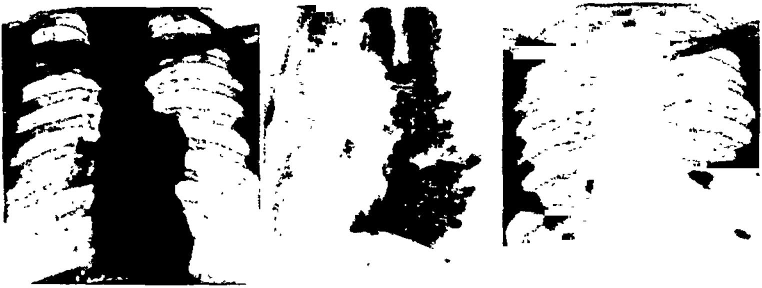


Fig. 3 (*Case 5*).—Dermoid cyst of the anterior mediastinum. *Left*, before operation; *center*, preoperative lateral view; *right*, after operation.

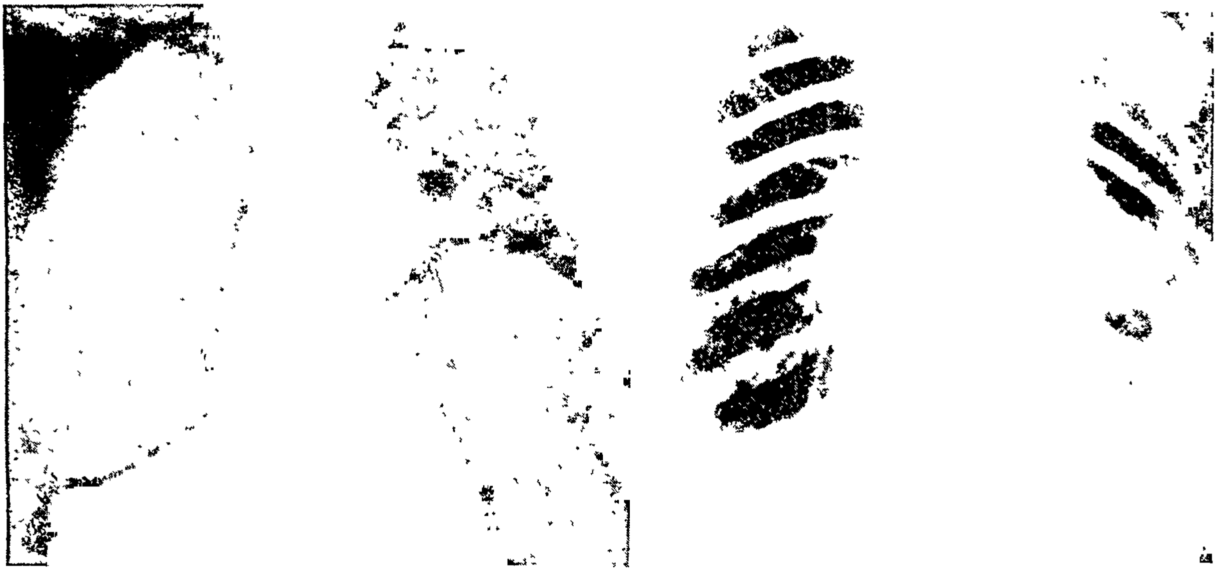


Fig. 2 *(Case 2).*—Dermoid cyst of the anterior mediastinum. *Left,* before operation; *right,* after operation.

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Operation.—An incision was made along the third intercostal space, between the parasternal and the median axillary line. Through the large opening of the pleura a large mediastinal tumor was removed, together with large segments of the second, third and fourth ribs. The tumor was of unequal consistency. It was round, measuring 13 cm. in diameter. It contained a large suppurating cavity. Microscopic examination revealed a squamous cell carcinoma implanted in a dermoid cyst.

Course.—The patient was feverless on the fourteenth postoperative day and left the hospital after twenty-two days. A year and a half after the operation she was in good health (Fig. 4, right).

CASE 5 (*ectodermal cyst*).—B. M. of Bologna, aged 54, had suffered for many years from a harassing incurable cough. Blowing rales were heard all over the pulmonary field. Roentgen examination (Fig. 5, left and center) showed a large cystic shadow at the base of the right hemithorax, with a visible hydroaeric level. It extended medially into the posterior mediastinum and downward into the diaphragm and was neatly delimited by an opaque rim. Bronchographic study showed that the bronchioles were divaricated and encircled the cyst.

Operation.—Posterior thoracotomy was performed, with resection of the posterior tract of the fourth to the seventh ribs. Adhesive pleurisy was present. In the posterior mediastinum a large cavity was seen, containing mucous fluid. On thoracoscopic examination the wall of the cyst was seen to be smooth and vascular; there was no recognizable evidence of connection with the bronchial tree. A pleural pouch was suspected; after a week a phrenicoexeresis was effected, and after fifteen days a thoracoplastic operation was performed. At this operation the correct diagnosis was made and the whole wall of the cyst was removed. It consisted of two layers: an external membrane with connective tissue and numerous vessels, and an internal one made up of cylindric stratified epithelium with ciliated cells (definitive diagnosis, posterior mediastinal cyst of ectodermal origin). After the last operation the patient recovered completely. Gauze packing soaked with opaque substance shows the zone in which the cyst was located (Fig. 5, right).

Operation.—An incision was made following the third intercostal space. Through the opening of the mediastinal pleura the cyst was easily isolated and removed by means of puncture and suction. Drainage was instituted.

Course.—Convalescence was uneventful. The *patient recovered and left the hospital twenty-five* days after the operation.

CASE 12 (*parasitic cyst*).—R. S., of Trani, aged 67, had felt one year previously an acute pain in the left hemithorax during inspiration. Six months later there was fever with coughing and abundant expectoration, but the temperature did not rise above 38 C. Hypophonesis and a few rales were noted at the base of the left hemothorax. The Cassoni and Ghendini reactions were negative. The leukocyte count showed 5 per cent eosinophils. Roentgen examination revealed a paravertebral spherical shadow as large as a big hen's egg at the base of the left hemithorax. The mass rested on the diaphragm; on its medial side it extended into the mediastinum.

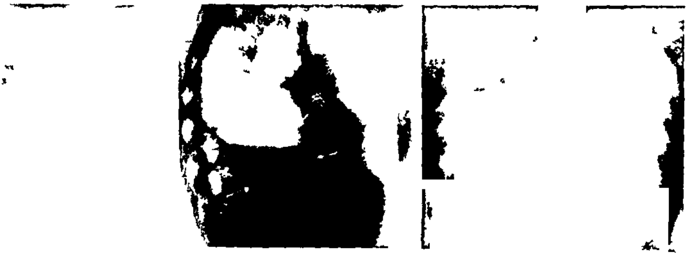
Operation.—A posterior thoracotomy was performed between the paravertebral line following the ninth intercostal space. The tenth and eleventh ribs were removed. A large cyst was observed in the posterior mediastinum. The pericystic membrane was joined to the pleura. The cyst was punctured, emptied and removed by suction. The pleural cavity was drained. The diagnosis was echinococcus cyst of the posterior mediastinum.

Course.—Recovery was uneventful. There was no fever after the tenth day. The patient left the hospital twenty days after the operation.

COMMENT

Of 12 mediastinal cysts surgically treated and studied by us 4 were dermoid cysts (1 in malignant metaplasia), 1 was an ectodermal cyst and 7 were echinococcus cysts. All 4 of the dermoid cysts were in the anterior mediastinum and of the laterothoracic type (Duval). The ciliated cyst was located in the posterior mediastinum. Of the 7 echinococcus cysts 4 were located in the anterior and 3 in the posterior mediastinum. The localization in the anterior or the posterior mediastinum has been ascertained on the basis of stratigraphic as well as operative observations. The largest size was observed in 1 case of echinococcus cyst of the anterior mediastinum; in this case the cyst extended into both hemithoraxes. In the whole group of mediastinal cysts described no very important mediastinal syndrome was noted. In 2 cases only (1 of echinococcus cyst and 1 of dermoid cyst) was there a complete absence of symptoms. In only 1 case of dermoid cyst was there a really characteristic symptom: hair in the sputum. In 2 cases there were clinical signs of suppuration. Three patients complained of pains of varying intensity and extent (notably the patient with the malignant metaplasia). Of the 7 cases of echinococcus cyst a venous collateral reticulum was present in only 1 and in only 1 was there an anatomic modification of the subclavicular region. Dyspnea also appeared in only 1 case. Finally, only 1 patient complained of inspiratory pain and hiccough. Three had fever and various pains. Two had chronic bronchitis. Six had been coughing for a long time with abundant expectoration (blood in the sputum in 3 instances).

The biologic test of Cassoni gave a positive



(Case 5).—Ciliated cyst of the posterior mediastinum. *Left*, before operation; *center*, preoperative lateral view; *right*, after operation.

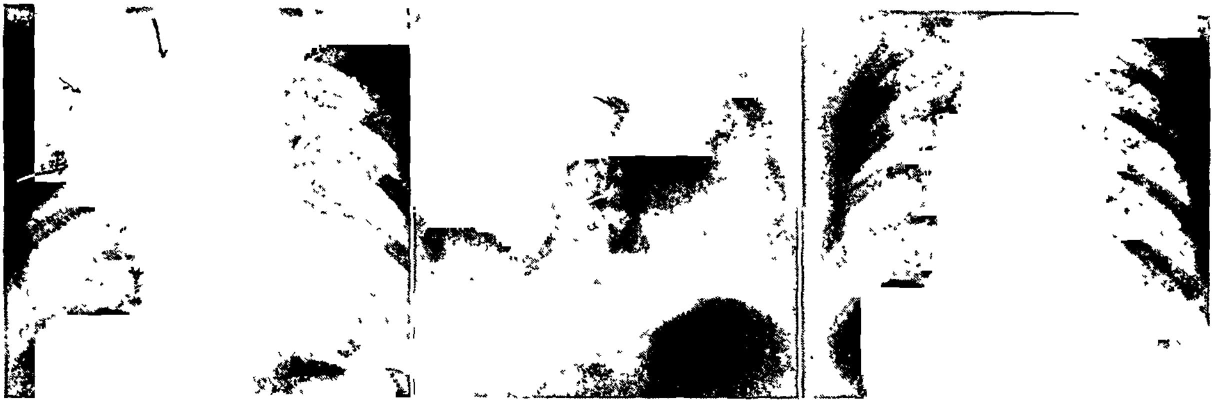


Fig. 4 (*Case 4*).—Dermoid cyst of the anterior mediastinum with malignant metaplasia. *Left*, before operation; *center*, preoperative lateral view; *right*, after operation.

and 100 small cysts emerged; more cysts could be extracted by introducing the whole hand into the cavity. The two large cavities were intercommunicating. The diagnosis was enormous bilocular hourglass echinococcus cyst of the anterior mediastinum.

Course.—There was serofibrinous pleurisy (Fig. 6, lower left) after the operation. The patient recovered, leaving the hospital thirty days later (Fig. 6, lower right).

Case 9 (*parasitic cyst*).—C. G. of Rome, aged 50, had suffered for more than a month with a harassing cough, with scanty mucous sputum and dyspnea which disappeared completely as soon as the patient lay down in bed. The veins of the neck were dilated; a venous reticulum was evident on the thoracic wall from the supraclavicular zone down to the sixth intercostal space; blowing rales were noted in the superior right thoracic field. The Cassoni and Ghedini reactions were positive; the leukocyte count showed 12 per cent eosinophils. Roentgen examination of the anterior mediastinum showed a large shadow of the size and the shape of a tennis ball, jutting out in the superior part of the right pulmonary field. The mass displaced the aortic arch downward and outward.

Operation.—An anterior incision was made, following the second intercostal space on the right side, between the parasternal and the anterior axillary line. As soon as the pleura was opened a huge nonpulsatile mass appeared in the anterior mediastinum. Its size was that of a hen's egg. An incision of the mediastinal pleura was made. Puncture of the mass, followed by suction, permitted complete removal of the cyst. The diagnosis was echinococcus cyst of the anterior mediastinum.

Course.—Recovery was uneventful. The patient left the hospital on the fifteenth day, recovered.

Case 10 (*parasitic cyst*).—T. G. of Teramo, aged 26, had been in apparent good health until twenty days before examination, when there occurred vomiting of a material in which the family physician recognized some daughter cysts. Blowing rales were detected all over the whole right thoracic field. The Cassoni and Ghedini reactions were positive; eosinophils, 2 per cent. Roentgen examination showed two spherical shadows in the inferior part of the right thoracic field. A third, supradiaphragmatic shadow appeared close to the heart. In a lateral projection this shadow seemed to be located in the posterior mediastinum.

Operation.—An anterior incision was made, following the sixth intercostal space between the parasternal and the median axillary line. Through the opening of the pleura in the posterior part of the inferior mediastinum appeared a mass the size of a large hen's egg. Puncture and suction of the cyst were carried out. Removal of the pulmonary cysts was deferred owing to a derangement in the anesthetic apparatus. The diagnosis was echinococcus cyst of the posterior mediastinum and of the right lung.

Course.—Convalescence was uneventful. (One month after the operation the patient suddenly died of an enormous flooding of the bronchial tree.)

Case 11 (*parasitic cyst*).—S. S. of Rome, aged 23, underwent a roentgen examination a year and a half before examination here. Two cystic bulks were discovered, one in the right lung and the other in the anterior mediastinum. There had been a harassing cough for two years, with scant expectoration; sometimes a little blood was mixed with the sputum. For one year the patient had had occasional light pains in the right hemithorax. There were no important clinical signs or symptoms. The Cassoni reaction was positive, the Ghedini negative. The leukocyte count showed 2 per cent eosinophils.

Operation.—An incision was made following the third intercostal space. Through the opening of the mediastinal pleura the cyst was easily isolated and removed by means of puncture and suction. Drainage was instituted.

Course.—Convalescence was uneventful. The patient recovered and left the hospital twenty-five days after the operation.

CASE 12 (*parasitic cyst*).—R. S. of Fram, aged 67, had felt one year previously an acute pain in the left hemithorax during inspiration. Six months later there was fever, with coughing and abundant expectoration, but the temperature did not rise above 38 C. Hypophonesis and a few rales were noted at the base of the left hemothorax. The Cassoni and Ghendini reactions were negative. The leukocyte count showed 5 per cent eosinophils. Roentgen examination revealed a paravertebral spherical shadow as large as a big hen's egg at the base of the left hemithorax. The mass rested on the diaphragm; on its medial side it extended into the mediastinum.

Operation.—A posterior thoracotomy was performed between the paravertebral line, following the ninth intercostal space. The tenth and eleventh ribs were removed. A large cyst was observed in the posterior mediastinum. The pericystic membrane was joined to the pleura. The cyst was punctured, emptied and removed by suction. The pleural cavity was drained. The diagnosis was echinococcus cyst of the posterior mediastinum.

Course.—Recovery was uneventful. There was no fever after the tenth day. The patient left the hospital twenty days after the operation.

COMMENT

Of 12 mediastinal cysts surgically treated and studied by us 4 were dermoid cysts (1 in malignant metaplasia), 1 was an ectodermal cyst and 7 were echinococcus cysts. All 4 of the dermoid cysts were in the anterior mediastinum and of the laterothoracic type (Duval). The ciliated cyst was located in the posterior mediastinum. Of the 7 echinococcus cysts 4 were located in the anterior and 3 in the posterior mediastinum. The localization in the anterior or the posterior mediastinum has been ascertained on the basis of stratographic as well as operative observations. The largest size was observed in 1 case of echinococcus cyst of the anterior mediastinum; in this case the cyst extended into both hemithoraxes. In the whole group of mediastinal cysts described, *no very important mediastinal syndrome* was noted. In 2 cases only (1 of echinococcus cyst and 1 of dermoid cyst) was there a complete absence of symptoms. In only 1 case of dermoid cyst was there a really characteristic symptom: hair in the sputum. In 2 cases there were clinical signs of suppuration. Three patients complained of pains of varying intensity and extent (notably the patient with the malignant metaplasia). Of the 7 cases of echinococcus cyst a venous collateral reticulum was present in only 1 and in only 1 was there an anatomic modification of the subclavicular region. Dyspnea also appeared in only 1 case. Finally, only 1 patient complained of inspiratory pain and hiccough. Three had fever and various pains. Two had chronic bronchitis. Six had been coughing for a long time, with abundant expectoration (blood in the sputum in 3 instances).

The biologic test of Cassoni gave a positive

FIG. [illegible] (*Case 5*).—Ciliated cyst of the posterior mediastinum. *Left*, before operation; *center*, preoperative lateral view; *right*, after operation.

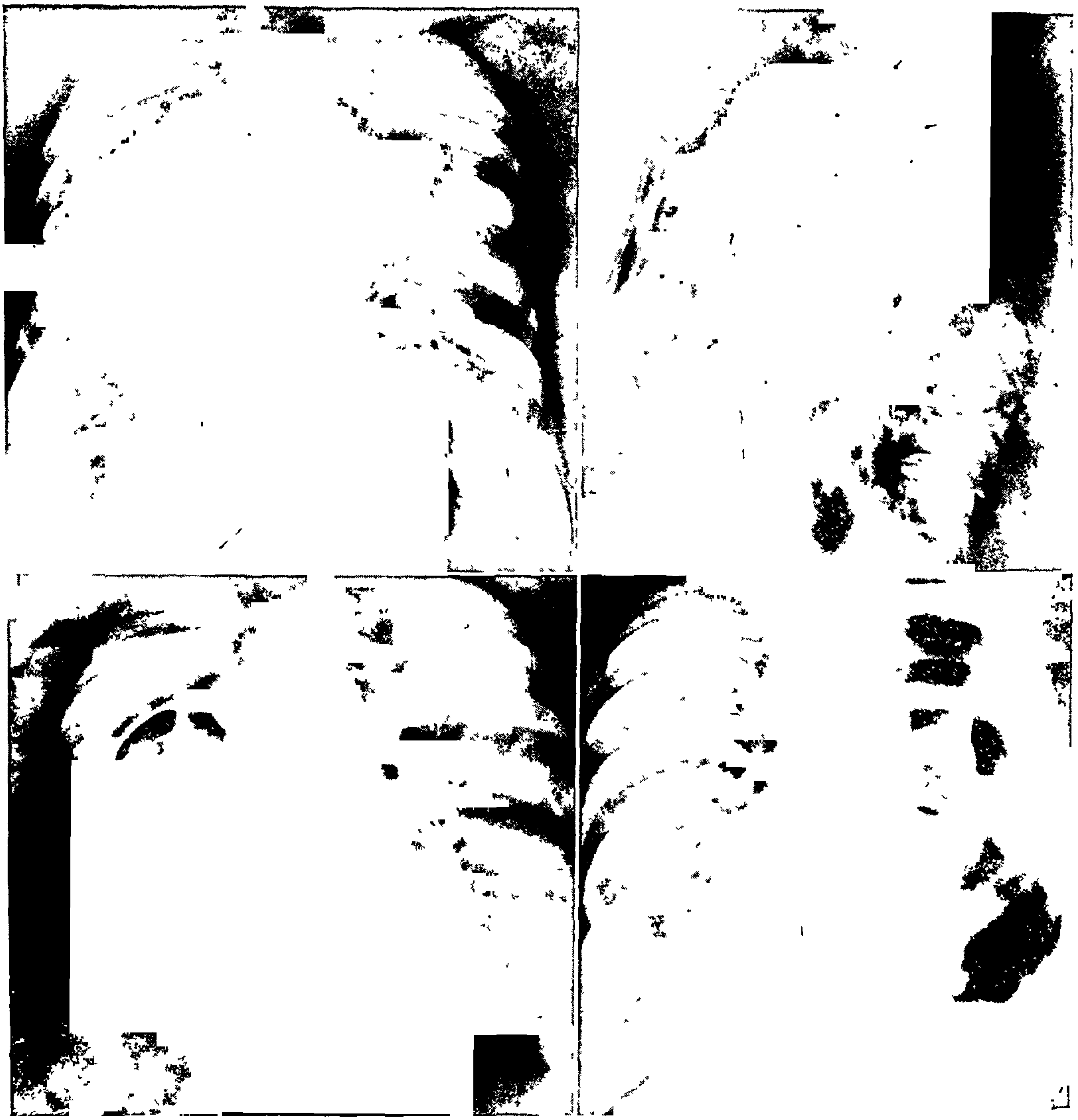


Fig. 6 *(Case 8)*.—Gigantic echinococcus cyst of the anterior mediastinum. *Upper left,* before operation; *upper right,* preoperative lateral view; *lower left,* film taken nine days after operation; *lower right,* film taken forty-five days after operation.

result in 5 of the 7 cases; the Ghedini test, in 3. Eosinophilia was evident in 3 cases. The patient with ciliated cyst had been complaining for many years of chronic bronchitis.

Roentgen control made possible the diagnosis in 6 cases, and in only 3 was the diagnosis categorical. The bronchographic picture of the ciliated cyst was very interesting. One echinococcus cyst of the anterior mediastinum reached an enormous volume.

In most cases the patient was prepared for the operation as follows: hyperalimentation (proteins and vitamins), respiratory and gymnastic exercises, and antibiotics. The anesthesia of choice for the last few years has been, generally, intubation with 0.02 per cent pentothal and curare Formerly local anesthesia was employed Systematic prophylaxis against operative shock before, during and after the operation was carefully maintained

In the 4 cases of dermoid cyst the operation was performed through the pleural cavity In the 7 cases of echinococcus cyst it was carried out 6 times through the pleural cavity and only once by the parasternal approach As regards *the case of ectodermal cyst since the* diagnosis was mistaken the radical paraverte bral extrapleural operation was preceded by a phrenicoexeresis and by a thoracoplastic procedure Dilation of the lung in cases in which operation was performed through the pleura has been practiced generally by means of suction through a drainage tube until the correct negative pressure in the pleura was obtained As a routine treatment we thought it wise in each case to leave usually no longer than forty eight hours a drainage tube in situ to prevent the dreaded complication of diastinal emphysema, especially when laborious detachment of the pleural sheets had been necessary In the other cases the drainage tube was left in place and gradually reduced in size while the cavity was progressing toward complete elimination of the dead space In these same cases, though seldom the drainage tube was utilized to inject the usual antiseptics and antibiotics into the residual cavity

SUMMARY

The authors present their study of a series of 12 cases of mediastinal cyst (4 dermoid 1 ciliated, 7 parasitic) in which they operated successfully

RESUMÉ

Les auteurs étudient une série de 12 kystes mediastinaux (4 dermoides 1 cilié et 7 parasitaires) qu'ils ont opérés avec succès

RESUMEN

Los autores presentan su estudio de una serie de 12 casos de quiste mediastinico (4 dermoides 1 ciliado 7 parasitario) que fueron operados con exito

RIASSUNTO

Presentano 12 casi di cisti del mediastino (4 dermoidi, 1 ciliata 7 parassitarie) operati felicemente

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If the conquests useful to humanity touch your heart, if you are astounded at the astonishing results of telegraphy, of photography, of anesthesia and of all the other admirable discoveries take interest I beg of you in those sacred dwellings which have been designated with the expressive name "laboratories " Demand that they multiply and be adorned, they are the temples of the future —*Pasteur*

My Experience with Total Gastrectomy

PROF. DR. HANS FINSTERER, F.I.C.S.*
President, Austrian Chapter, International College of Surgeons
VIENNA

IT HAS been a rule in radical operations for carcinoma to remove the entire diseased organ, e.g., the uterus or the breast, together with the tributary lymphatic system, in order to avoid recurrences both locally and in the lymphatic structures involved. According to my knowledge of the current literature, Lefèvre of Bordeaux is the only surgeon to advocate total gastrectomy even in cases of carcinoma located in the distal part of the stomach. He is fully entitled to call for total gastrectomy, which, in his own experience, *has had a mortality rate no higher than that* of subtotal gastrectomy. I myself have used, as the method of choice, *subtotal gastrectomy* with a small strip of fundus remaining. Ever since 1910, in the interest of a radical procedure, I have resected the greater omentum in all cases, together with the lymph glands, as well as the lesser omentum right up to the esophagus and the lymph glands adjacent to the celiac axis. Other surgeons have resected the omentum only during the last year or two.

If subtotal gastrectomy is adequately performed, the Billroth II anastomosis as done by Billroth himself is technically impossible. According to his original method the resection wound was completely closed and then a side-to-side anastomosis of the gastric stump with the first jejunal loop either retrocolic or antecolic, was performed. In view of the fact that these were small resections and that the gastric stump was large, the anastomosis was effected away from the closing suture line. In subtotal gastrectomy only a narrow strip of fundus is left and the side-to-side anastomosis is adjacent to the closing suture line of the stomach. The latter invaginates into the mouth of the gastroenterostomy and may cause death from repeated vomiting. I saw this at autopsy in several cases when I was an assistant surgeon at Hochenegg's Clinic. This can be avoided in subtotal gastrectomy only by using an end-to-side anastomosis. Reichel and Polya have used the entire breadth of the gastric stump to form the anastomsis. I close the upper part of the resection wound and perform an anastomosis corresponding to the greater curvature, leaving only a 3-fingerbreadth opening. I performed this operation for the first time on Sept. 18, 1911, at Hochenegg's Clinic. The patient was a 59-year-old woman who had a fist-sized carcinoma of the lesser curvature that extended up to the cardia. The Billroth II method was impracticable in her case because *of the small gastric stump. I presented an* exhaustive case history of this patient in my paper "Local Anesthesia with Gastric Surgery" (Beiträge zur klin. Chir. **81**:303, 1914). The postoperative course was highly satisfactory, and there was no vomiting. Therefore I have used this method ever since, not only in subtotal resection for carcinoma but in two thirds of all gastrectomies for peptic ulcers. I have records of over 8,000 patients treated by this method.

In cases of carcinoma of the lesser curvature extending into the right wall of the esophagus I have also resected this part of the esophagus in my subtotal gastrectomies. I tried to strengthen the suture line of the right wall of the esophagus, which has no peritoneal covering, with the fundus, which I fixed to it, or with the afferent anastomotic loop. At that time I wished to avoid total gastrectomy because of its high mortality. The results were poor; of 55 patients, 41 (74.5 per cent) died. This high mortality rate prompted me to suggest, in a major publication on carcinoma of the stomach, that total gastrectomy would be preferable in such cases only if it were possible to decrease its mortality.

Total gastrectomy was carried out successfully for the first time by the Swiss surgeon Schlatter in 1897, in the case of a 57-year-old woman who had a carcinoma involving the entire stomach, from the pylorus to the cardia. In the ensuing years, apparently, this operation was rarely performed; there are only a few reports of its success.

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*First President, Austrian Chapter, International College of Surgeons, 1948-1950.

From the Surgical Ward of the Allgemeines Krankenhaus, Vienna, Prof. Dr. H. Finsterer, Director.

Forty two years ago the French surgeon Delagenière called total gastrectomy the only warranted radical operation He added however, that a narrow strip of fundus should be preserved in order to accomplish a reliable anastomosis This is rather a subtotal than a total gastrectomy A strip of fundus tissue 5 to 8 cm long is left *in situ* Stahnke in 1933 was able to collect 62 cases of total gastrectomy from the current literature, including 3 in which the patients had been successfully operated on by A W Meyer Goto (Japan) in 1933 compiled 140 cases of total gastrectomy from the American and European literature adding 65 cases from Japan Only 6 authors—I was one of them with 20 total gastrectomies—had operated on 14 to 20 patients themselves During the past ten years total gastrectomy will certainly have increased in number of performances

Since my first total gastrectomy, which I performed on April 30, 1913, as an assistant at Hochenegg's Clinic on a 47 year old man (local anesthesia of the abdominal wall and ether anesthesia were used, the patient died of pneumonia twelve days after the operation) I have done total gastrectomies in 124 cases up to Dec 31 1949 I operated in several private hospitals and since August 1935, in the surgical ward of the Allgemeines Krankenhaus Sixteen total gastrectomies will be added which were performed by my assistants Bischof, Walterskirchen and Winkler We therefore have a total series of 140

Total gastrectomy was performed only after a diagnosis of carcinoma of the stomach In 4 cases however the pathologic picture as observed microscopically did not confirm this diagnosis

Case 1—A 40 year old officer was operated on Dec 20 1916 at Garnisonspital No 2, with the roentgen diagnosis of carcinoma of the stomach (Holzknecht) A small and shrunken stomach was found on operation, with an apple sized mass in the fundus Subtotal gastrectomy was not applicable, and total gastrectomy was therefore performed Twenty cm of jejunum had to be resected because its mesentery had shrunk considerably This enabled me to do an end to end anastomosis with the esophagus and prevented tension in the bowels reattached to one another Histologic diagnosis (done by Professor Paltauf) revealed no carcinoma but a shrunken stomach due to syphilis Thirty six hours later the patient died At post mortem examination Prof Paltauf observed an enormous dilation of the duodenum due to its compression through the mesentery of the anastomotic loop Prof Paltauf was of the opinion that death was caused by shock due to a duodenal reflex mechanism

Case 2—A 52 year-old woman, a doctor's wife underwent a two stage operation on June 24, 1935 because of gastric polyposis which had lasted for three years and had produced severe anemia (2,400,000 erythrocytes per cubic millimeter of blood and a hemoglobin value of 30 per cent) In her first operation an ulcerated, broad necked polyp was seen, which was thought to be carcinoma The esophagus was pulled down from the mediastinum and attached to the diaphragm The first loop of the jejunum was pulled through the mesocolon and slid into the upper abdomen, and an enteroanastomosis of the two loops was formed Two weeks later total gastrectomy was performed after a laparotomy in the area of the left inferior costal margin An end to side anastomosis between the esophagus and the jejunal loop in the upper part of the abdomen was performed Histologic examination by Prof Sternberg revealed a large ulcerated polyp of the stomach, without signs of malignancy The anastomosis healed without fistula formation However, gangrene of the muscles of the upper wound margin ensued because of inadequate blood supply, and chronic septicemia ended the patient's life four weeks after the operation

Case 3—A 40 year old woman on whom operation had been performed Oct 18, 1943, had numerous firm polyps in the pars media and pars cardiaca which were broad necked in the vicinity of the cardia I therefore suspected that they were carcinomatous and performed a total gastrectomy Histologic examination (by Prof Chiari) revealed polyp formation without malignancy There was considerable postoperative pyrexia, and death occurred in six days Autopsy revealed a left subphrenic abscess due to insufficient draining (the rubber drain was too short to reach the abscess) In addition, there was empyema of the left pleural space and splenomegaly caused by septicemia

Case 4—A 54 year old man had been having gastric trouble for a long time Four months previously he had undergone an exploratory laparotomy in another hospital, and the diagnosis had been carcinoma of the stomach The neoplasm extended into the spleen and the esophagus and was declared inoperable The patient was admitted to my service because of extreme pain The gastrointestinal roentgen series suggested a mass in the cardial area of the stomach with questiona [illegible] ene [illegible] lated rup ture into the spleen. Esophagoscopic study revealed no abnormalities of the esophagus and no mass in the cardia. On Sept. 20, 1948, I operated. A medium-sized laparotomy was done with the operative region under local anesthesia. Ether anesthesia was used for the adhesiolysis, followed by spinal anesthesia. There was a mass present on the greater curvature which extended to the spleen and to the pancreas. Gastrotomy and digital exploration revealed a deep crater, with a rather firm and nodular floor, extending to the spleen. Ulcerative carcinoma was suspected. Total gastrectomy with splenectomy and resection of the tail of the pancreas was performed. The splenic artery showed an abnormality in that it was imbedded in the pancreas and emerged to the surface only at the cauda. I performed an anastomosis, uniting the esophagus with the jejunum in accordance with Lèfèvre's method. Sulfonamide powder (Marfanil) was used for the left subdiaphragmatic area, and 2 gauze strips were inserted in order to counteract the displacement of loops of the small bowel above the level of the transverse colon. Two rubber tubes were fixed, and a closing abdominal suture line ended the operation. Prof. Chiari (Pathological Institute) reported a large callous peptic ulcer of the greater curvature, with penetration into the spleen. There was also chronic gastritis. No substratum for malignancy was observed in this very large peptic ulcer. A postoperative blood transfusion was followed by a second transfusion on the following day, and the patient also received treatment with penicillin. The postoperative course was remarkable. During the first week the patient's temperature never exceeded 38 C. (100 F.); after that time it remained normal. The anastomosis healed without fistula formation, but there was afebrile suppuration from the left hypochondrial area for some time. Six weeks later the patient was discharged cured. He now lives in the open country and reported on April 5, 1949, that he is free of discomfort and is able to eat anything, including kidney beans, peas and kraut. He also reported a gain in weight of 13.2 pounds (6 Kg.).

In the first of these 4 cases I might have avoided failure of the operation if, in performing the Y-shaped anastomosis, I had connected the efferent jejunal loop, with its short mesentery, to the esophagus behind the afferent rather than before the afferent loop. This might have prevented compression of the afferent loop and, consequently, death due to the duodenal reflex mechanism. In the second case a midline laparotomy should have been preferred to the second operation actually performed. The left rectus muscle should have been severed transversely, which I always do in performing a total gastrectomy. This would have obviated gangrene of the abdominal wall, which was all the more deplorable as the anastomosis healed without fistula formation. In case 3, again death might have been prevented if a rubber drain of sufficient length had been used in conjunction with gauze strip drains.

Case 4 represents my only total gastrectomy for a callous peptic ulcer in a total of 140 total gastrectomies performed. During operation, in some cases, it is not possible to tell the difference between a callous peptic ulcer and a secondary malignant tumor developing in a peptic ulcer. Even gastrotomy and bare finger palpation of the ulcer margins is not conclusive. In case 4 I was convinced of the diagnosis of carcinoma resulting from the first operation, because a peptic ulcer of the greater curvature is extremely rare. Also, the fact that the base of the tumor was rather firm and nodular made me think of an ulcerative carcinoma that had extended to the spleen and to the pancreas. I consequently tried total gastrectomy with splenectomy and resection of part of the pancreas because of the comparative youth of the patient. I was lucky that the patient was cured. However, there is a possibility that secondary anemia will follow total gastrectomy; this is accepted by patients with carcinoma as a minor evil, but it is not warranted when total gastrectomy is performed for a peptic ulcer. Had the correct diagnosis of peptic ulcer been established, I should have performed the Kelling-Madlener procedure, which would have certainly cured even this huge ulcer.

If differential diagnosis between peptic ulcer and carcinoma is doubtful after gastrotomy and digital exploration, I base my decision on the general status of the patient and on the extension of the tumor into adjoining structures (spleen, pancreas, liver). Only if carcinoma is the more likely diagnosis do I consider total gastrectomy indicated, for it still has a high mortality rate in my own experience. If peptic ulcer seems more likely, I perform the Kelling-Madlener operation. The cardial part of the ulcer is left *in situ* and only the distal part of the stomach is resected (according to Billroth I), or else I do a two-thirds gastrectomy by the Hofmeister-Finsterer technic.

The Kelling Madlener procedure is rarely necessary for peptic ulcers located in the vicinity of the cardia. Of 614 cases of ulcer near the cardia in which I operated up to Jan 1 1949, the ulcer was removed in 535 cases by the curved resection method, in only 79 cases was a Kelling Madlener technic required. The ulcer healed a short while after this procedure and the permanent results are therefore good. In a follow up check in 1945 33 of 35 patients who had reported had been free of symptoms for three to ten years. Madlener himself had similar satisfactory results. Of his 29 patients 27 were completely asymptomatic for three to sixteen years and so were 2 additional patients after one year.

In 4 Kelling Madlener operations I was unable to decide diagnostically between a simple peptic ulcer and an ulcer carcinoma, but I discarded total gastrectomy because of the patients' age and poor general condition. I did the resection according to Kelling Madlener rather than declare them inoperable. Two of these 4 patients died of carcinoma whereas the 2 others, who had peptic ulcers only have been completely asymptomatic for the past ten years. Had I tried total gastrectomy on these patients in whom the peptic ulcer extended into the pancreas they would probably have succumbed just as did the 2 others with carcinoma since their general health was poor.

Total gastrectomy will still be performed in some cases in which peptic ulcer is believed to be carcinoma. However I think it unwarranted when the diagnosis of peptic ulcer is made beforehand even if the ulcer extends into the cardia. Total gastrectomy was advocated even under these conditions by Gissel in 1937, in a report on 26 such operations performed at the Rostock Clinic, Germany. In his series there were 4 peptic ulcers 2 of which were operated on as carcinomas and 2 others which were known to be peptic ulcers, total gastrectomy was done in all 4 cases because a normal resection was not feasible owing to a shortening of the lesser curvature. In my own experience these ulcers of the lesser curvature even if they extend up to the cardia can be removed radically and successfully with the curved resection technic and a Hofmeister Finsterer anastomosis. I have proved this in 535 patients who had the benefit of this technic.

Judin (Moscow) in a paper on local anesthesia in major gastric surgery was able to report as early as 1930 that he had successfully performed 5 total gastrectomies. One patient had syphilis of the stomach, and 4 had peptic ulcers. All were cured which certainly is a remarkable result. In Judin's view this was due to the use of local instead of general anesthesia. My opinion is that his results were due to his excellent technic and to the fact that the patients had peptic ulcers. I should say that *total gastrectomy for peptic ulcer is not indicated,* no matter what satisfactory results have been achieved with it. Curved resection and the Kelling Madlener technic have had very encouraging immediate and permanent results even with highly located ulcers. These procedures may be carried out by any surgeon who is familiar with gastrointestinal procedures.

The indication for total gastrectomy will be discovered in most cases only during the operation. In some cases the gastrointestinal roentgen series revealed carcinoma near the cardia and laparotomy disclosed its actual location to be far from the cardia so that subtotal gastrectomy was adequate.

On the other hand, gastrectomy is not possible if there are peritoneal or hepatic metastases. Total gastrectomy as a palliative operation does not seem warranted to me because of its high operative mortality. Old age and emaciation however, do not contraindicate the procedure since a life that would otherwise be lost may be saved by it. Of the 140 patients on which I performed this operation 59 were from 60 to 70 years old (42 per cent); 24 were cured (40 per cent). Of Goto's 21 patients 13 were under 50 and the oldest was 61. Undoubtedly the immediate results will be better in these comparatively young patients.

The type of anesthesia is of the utmost importance. Deep general anesthesia has been completely discarded. My first 3 patients were operated on with local anesthesia of the abdominal wall and mesenteric anesthesia with ether as an adjuvant. Since 1920 all patients have been subjected to spinal anesthesia. At first a 0.5 per cent solution of novocain was used but because of the short duration of the anesthesia (one and one half to two hours) it had to be repeated in most cases. Later I used pantocaine in a 1:1,500 solution. For anesthesia of the abdominal wall and for spinal anesthesia, up to 300 cc. of this solution was injected. The resulting anesthesia lasted for three to four hours and did not require repetition. After 1945 pantocaine was not available, as it was supplied by the I. G. Farben Company in Germany, and I returned to the use of novocain and procaine. Procaine has a slightly shorter anesthetic effect than has novocain. In spite of this fact, it was not necessary to use ether even for short periods after the spinal injection had been repeated. The satisfactory results achieved with spinal anesthesia never called for high lumbar anesthesia, which is sometimes dangerous owing to its considerable depressive action upon the blood pressure.

Since no general or deep anesthesia was used, fatalities due to shock within the first twenty-four to forty-eight hours were avoided. The 5 fatalities that occurred within forty-eight hours after operation were due to a fatal duodenal reflex, and in 3 cases they were caused by acute mediastinitis caused by opening of the anastomotic suture line. In the last case death was due to coronary thrombosis with high-grade arteriosclerosis and syphilitic aortitis.

I always performed total gastrectomy *per laparotomiam*, since a high pressure apparatus for transthoracic operations is not at my disposal. (This apparatus should be available, however, because of the possibility of interfering with the contralateral pleura while the operation is in progress—even if the apparatus is necessary only upon closure of the thoracic cavity.) In order to achieve a better operative field for a medium-sized laparotomy, the left rectus muscle is severed. The xiphoid process is also removed, according to Lefèvre's suggestion. The left lobe of the liver is mobilized after severance of the ligament that runs to the left side of the diaphragm and to the spleen.

Total gastrectomy is performed only if the carcinoma has not extended to the adjacent structures and if the enlarged glands of the celiac axis can be radically removed, thus providing some chance of permanent cure. As in every gastrectomy for carcinoma, the greater omentum as well as the lesser should be removed up to the esophagus.

I always start total gastrectomy with severance of the duodenum, which I close in a typical way: The duodenum is ligated 1 cm. distal to the pylorus, and 1 cm. distal to this ligature I apply a purse-string suture. Proximal to the ligation I clamp the duodenum with a forceps and sever it by thermocautery. Then I invert the ligated duodenal stump, knot the purse-string suture and put two Lembert sutures on top. With this type of duodenal suture I have never encountered any leakage of the suture line, even in a normal gastrectomy.

Next I separate the greater omentum from the transverse colon and tie up the gastrosplenic ligament; then I remove the lesser omentum up to the esophagus. Ligation of the left gastric artery follows, and I try to avoid interfering with the ascending branch of this vessel, in order that the esophageal blood supply may be maintained. The esophagus is then mobilized by circumcision of the peritoneal cover on the diaphragm and pulled out of the mediastinum without producing tension. Just above the cardia two angular squeeze forceps (Wertheim forceps) are applied, and the esophagus is severed between them; thus the stomach is cut loose. A slit is made in the mesocolon, and the first jejunal loop is pulled into the upper abdominal quadrant and anastomosed with the esophagus. In my first 3 cases I performed an end-to-end anastomosis with the distal loop of the jejunum, which had previously been severed 20 cm. from the duodenojejunal fold. The proximal loop of the jejunum was implanted end to side in the efferent loop, producing thus a Y-shaped anastomosis. In my later cases I made an end-to-side anastomosis with the first jejunal loop, and the afferent and efferent loop were connected with a wide enteroanastomosis. The anastomosis between the esophagus and the jejunum is done with two rows of silk stitch sutures, and the anterior wall of the anastomotic loop is further fixed to the diaphragm with another line of interrupted sutures. Finally the slit in the mesocolon is attached to the jejunal loop with a line of sutures above the enteroanastomosis.

Because of the uncertainty of the anastomotic suture line, the upper abdominal area is drained, with one drain on each side of the anastomosis. In addition, a gauze strip is inserted in the left hypochondriac area and another is placed on the transverse colon in order to isolate the upper abdominal area completely from the free peritoneal cavity. In the first years during which I performed this operation I also did a jejunostomy in order to spare the anastomosis and to promote immediate nutrition. Owing to the reflux of bile ahead of the jejunostomy, frequent vomiting occurred, considerably endangering the esophageal suture line. I have discontinued primary jejunostomy for the past nine years However, I mark the site for a secondary jejunostomy, which is approximately 30 cm distal to the enteroanastomosis, by doing three serosal stitches in a triangular arrangement, pointing distally During the past nine years I have had to perform a secondary jejunostomy in only 10 cases in each of them because nearly all food had left the fistula again

The enteroanastomosis which is added to the end to side anastomosis has the objective of preventing pains that would be caused by retrograde filling of the afferent loop and of the duodenum Furthermore, a large excavation is formed, which serves as a substitute for the stomach in the admission of food Lahey, who in 1938 reported on 8 total gastrectomies with 5 cures said that the enteroanastomosis is disadvantageous and that he never uses it in his own cases In his opinion, the filling of the afferent loop, as demonstrated in every case by roentgenographic studies, is of definite advantage since its enlargement is a substitute for the stomach He has never observed the occurrence of any dyspeptic troubles as a result Retrograde filling of the afferent loop however, is likely to produce considerable discomfort after any gastrectomy performed by the Reichel Polya method To forestall these pains Reichel in an address to the German Surgical Congress in 1921 suggested enteroanastomosis between the afferent and the efferent loop

When one is doing the end to side anastomosis it may prove complicated to manage the posterior suture line in such a way as to avoid leakage This is what I have been doing for the past ten years to prevent cutting through of the first suture line I grasp the peritoneal cover of the pancreas the leaf of the diaphragm and the posterior wall of the esophagus with the suture then I tie the suture and then I fix the jejunal loop with this suture The four sutures are applied and then tied up In order to avoid leakage of the suture line some surgeons have tried to sever the jejunum and perform an end to end anastomosis between the esophagus and the efferent jejunal loop connecting the afferent jejunal loop end to side with the efferent jejunal loop By suturing the jejunum to the esophagus in several levels one can invaginate the suture line into the jejunum Seidl has modified the technic of the end to end connection between esophagus and jejunum he omits a mucosal suture between the two structures and instead pulls the esophagus into the jejunal loop

In order to achieve this a catgut suture is made on the esophagus then a forceps is inserted through a small incision in the jejunal loop grasping the catgut suture and pulling the esophagus into the jejunum as far as possible The seromuscular layer is fixed in a circle like fashion to the esophagus by several interrupted sutures On top of this a second and eventually a third row of Lembert sutures are superimposed and the jejunum is also fixed to the diaphragm Finally the afferent loop is sutured into the lateral mouth of the efferent loop, creating a Y shaped anastomosis With this procedure a piece of the esophagus 2 to 4 cm long lies free in the jejunal cavity, and part of it becomes necrotic without producing leakage of the suture line Seidl has used this method in 11 cases He reported 3 fatalities 1 due to pulmonary embolism 1 to pneumonia and 1 to gangrene of the esophagus

The suture line between esophagus and jejunum is unpredictable and complicated because the esophagus lacks a serosal cover which is so important for the cohesion of the two structures Therefore the cutting through of the suture line on the fifth to the seventh postoperative day may cause fistula formation or fatal peritonitis Lefevre (of Bordeaux) replaced the lacking serosa of the esophagus by wrapping the anastomosis in a serosal coat

The first jejunal loop is severed 10 to 20 cm away from the duodenojejunal fold and both ends are closed with an uninterrupted suture line and Lembert sutures The afferent and efferent loops are then connected to an extent of 3 to 5 cm at their peritoneal origin by interrupted sutures The esophagus is pulled out of the mediastinum for 3 to 5 cm and the efferent jejunal loop is fixed to the leaves of the diaphragm and to the posterior esophageal wall with several interrupted sutures Then the esophagus is severed 1 cm above the cardia and an end to side anastomosis is performed with a double row of stitches 2 to 3 cm away from the blindly closed end of the efferent loop On top of this anastomosis the blindly closed afferent jejunal loop is fixed to the anterior wall of the esophagus and to the diaphragmatic hiatus by interrupted sutures In a second suture line the afferent jejunal loop is fixed to the inferior aspect of the diaphragm Finally the efferent and afferent loops are tied together at their margin which is opposite the mesenteric border Through this procedure the anastomosis and the inferior margin of the esophagus are completely wrapped in the serosa of both jejunal loops Then an enteroanastomosis of the afferent and efferent loops is performed No drain is placed in the abdomen upon closure

After Lefevre had communicated his method and his good results to me I gave it a trial at once I had a failure in the first case because of a particularly narrow jejunum, the two loops compressed the esophagus, which became gangrenous and produced mediastinitis. The anastomosis, however, was completely segregated from the free peritoneal cavity. I have therefore modified Lefèvre's method in that I do not suture the intestinal loops together at their mesenteric origin; I suture them at the mesentery itself, 1 cm. away from the bowel, which prevents compression of the esophagus.

During the past two years I have generally used Lefèvre's method, or I have used the Y-shaped anastomosis, in which the posterior wall of the jejunal loop is fixed to the esophagus with a double suture line.

In cases of carcinoma of the cardia, resection of the upper half of the stomach may be carried out and the mouth of the stomach completely closed, an end-to-side anastomosis then being made between the esophagus and the distal stump of the stomach. In the best interests of a thoroughly radical gastrectomy, at least 3 to 5 cm. of the esophagus should be resected; therefore, the anastomosis is difficult to perform and the suture line is unreliable, even when the anastomosis is wrapped in the anterior wall of the stomach. I had 5 deaths in 8 operations of this kind. A transthoracic technic will probably make the suture line easier to maintain, and therefore the results may be expected to improve. I was obliged to send patients with carcinoma of the cardia (diagnosed by gastrointestinal roentgen and esophagoscopic study) to Denk's clinic, because I lack the apparatus for this method. Prof. Denk reported four years ago that his approach brings superior results. He told me personally that he had performed 43 transthoracic operations—36 resections of the cardia and 7 total gastrectomies, with satisfactory results. He will publish a report of his experience in the near future.

To Be Continued in June Issue

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Management of the Duodenal Stump in Operation for Penetrating Ulcer

PROF DR ALFREDO MONTEIRO, F A C S F I C S (HON)*
RIO DE JANEIRO

EVERY surgeon who performs gastroduodenal operations should bear in mind the words of Owen H Wangensteen's[1] sentence in his foreword to Rudolph Nissen's book "Peptic Ulcer" "Every surgeon soon learns that satisfactory closure of the duodenum is the sine qua non of a low mortality score'

This was my own experience especially when I was confronted with my first case of duodenal fistula For simple gastric and duodenal ulcers the classic technics usually give satisfactory results My own procedure underwent a marked evolutionary change when I decided to adhere to an aseptic technic using sutures that did not involve the mucosa and therefore eliminated the hazard of a septic closed cavity

At the beginning of my practice I closed the duodenal stump with two layers of sutures (*a*) total suture and (*b*) seromuscular suture (Lembert) Eventually I abandoned the total suture and employed only the Lembert suture using a clamp as in Mayo's method Later I closed the stump with or without crushing by a seromuscular purse string suture followed by an epiploplasty (Finsterer Montenegro)

Lately judging suture of the mucosa to be unnecessary and dangerous and to involve the septic closed cavity I crushed the duodenal stump and applied first a temporary ligature and then a purse string suture When the ends of this suture were tightened the thread of the ligature was cut with Barreto's guillotine In my opinion this procedure is ideal being strictly within the laws of aseptic surgery except in the case of an edematous duodenum in which the ligature may slip before the purse string suture is knotted

During the past few years having at my disposal a modified Von Petz clamp with clips devised by one of my collaborators (Eugenio de Souza) I began the use of this suturing instrument for duodenal closure completing the operation with "U" stitches uniting the anterior wall of the duodenum to the sheath of the pancreas and following this with a complementary epiploplasty I have never had bad results with either of the two technics The second has proved more effective in cases of simple ulcer owing to its simplicity cleanliness and security

If surgeons are desirous of adopting the safest and most secure technic for nonpenetrating ulcers—to avoid the most dramatic complication a duodenal fistula after gastric resection—does it not stand to reason that even more should be demanded of a technic for penetrating ulcers?

Early surgeons, to avoid such complications resorted to simple derivations in the form of gastroenterostomies In view of the bad results, Finsterer,[2] in 1918 proposed his "resection by exclusion" which, although it had merit still did not give the good results obtained by resection with excision Finsterer admitted the deficiency of his technic in certain cases and proposed to complete it by excision of the mucous membrane of the antrum and pylorus His technic won world wide recognition Meanwhile Nissen[3] in Germany and Pauchet[4] in France protested against gastrectomy by exclusion and each established a technic the two being fundamentally similar The new method was called Pauchet-Nissen's and was based on the following principles

1 Leaving *in situ* the base of the ulcer crater, but interrupting its communication with the duodenal lumen

2 Mobilizing the anterior wall of the duodenum (Nissen Clairmont) and suturing it to the capsule of the pancreas

3 Performing a complementary epiploplasty

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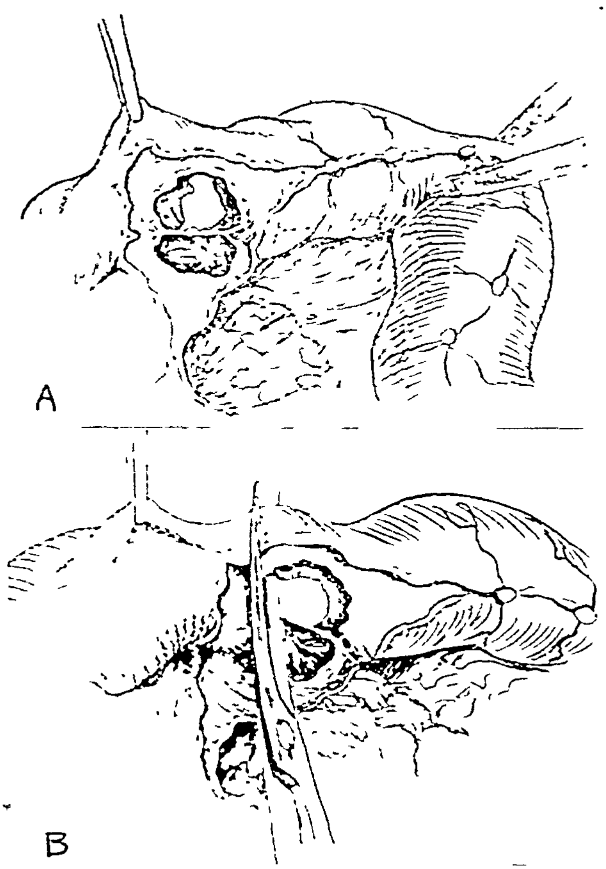

Fig. 1.—*A*, technic of mobilization of duodenum in ulcer of posterior wall. After mobilization of anterior wall and devascularization of antrum and pylorus, crater is opened close to greater and lesser curvatures. *B*, scissors applied for dividing anterior wall. Dotted line indicates incision completing exposure of crater.

SIMILAR PROCEDURES

Nowadays all surgeons who perform radical resection for penetrating duodenal ulcer do so essentially by the Pauchet-Nissen method or one of its variations. This technic is too well known to require description. I shall therefore describe only the mucosal cylinder method and the technical variations of the Monteiro school of surgery.

Dissection of the Duodenal Mucosal Cylinder (Collarette de Pauchet, 1933).—Credit must go to the French surgeon Victor Pauchet[4] for being the first to tackle in an efficient and practical way the resection of penetrating ulcers of the duodenum and stomach. Nissen himself (1945) admitted being inspired by the work of Pauchet on gastric surgery to systematize the procedure in relation to the duodenum. The French surgeon attacked this problem as early as 1927. He divided the duodenum below the ulcer, dissected the mucosal cylinder (collarette) and then resected it to diminish the volume of the duodenal stump; then he united the anterior wall of the duodenum to the sheath of the pancreas by two rows of sutures completed by a pedunculated segment of omentum tacked over the line of closure.

What is the difference between this method and the one called Nissen's? An unadvisable variation; that is, fixing the duodenal wall to the borders of the ulcer crater. Nissen's first publication appeared in 1937, when he pointed out an interesting factor of a more secure technic, which Pauchet had not insisted upon—preliminary mobilization of the anterior duodenal wall.

Detachment of the Submucosa (Hustinx-Montenegro).—According to Alberto Gutierrez,[5] Hustinx in Holland began in 1928 to use a method for deeply rooted duodenal ulcers which can be included among the various methods of submucosal detachment recommended by Benedicto Montenegro.[6] The illustration presented by the Argentine surgeon Guttierez shows a slight modification of the technic presented by Hustinx[7] in 1936.

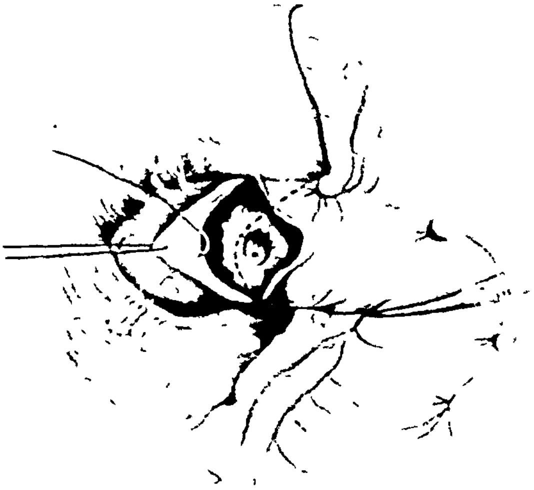

Fig. 2.—Small bleeding ulcer of posterior wall perforating into pancreas. After devascularization of pyloric region of stomach, anterior wall is opened by a semulunar incision; gauze sponge secured by a long thread is introduced into distal duodenal lumen. Posterior wall is incised through all layers from within, as shown by dotted line.

In 1937, Xavier Delore and Jean Braine[8] described at the Academy of Surgery of Paris a technic that one of them (Delore) had been practicing since 1925 Transcribing the words of the text, one sees that the procedure is identical to that of Hustinx Montenegro

"Apres la liberation du duodenum, le chirurgien incise circulairement ce duodenum sans entamer la muqueuse, grace au plan de clivage situe entre la seromusculeuse et la muqueuse, il peut alors de coller cette muqueuse sur une longueur variable Le decollement acheve, le cylindre muqueux est lie au ras de la collerette musculo sereuse avec un fil de catgut, puis sectionne au dela du fil La surface de section est touche a la teinture d'iode, le fil de ligature est coupe et le moignon duodenal se retracte dans le manchon musculo sereuse Ce manchon est alors suture en bourse en un ou deux plans, ce qui assure une etanchite absolue par dessus la suture, nous appliquons enfin un peu d'epiploon"

An interesting point is that, according to these surgeons the method cannot always be used "Notably it can be applied in cases of edematous and infiltrated duodenum or when in immediate contact with an ulcer" But it is just here that Pauchet, Hustinx and Montenegro use the method in cases of penetrating ulcers of the duodenum

It is always difficult to assign priority for a method Anglo Americans and Central Europeans claim this method as Nissen's though actually the pioneer was Pauchet The technic of detaching the submucosa was recommended by Delore, before Hustinx and Montenegro The technic of the Brazilian surgeon is the most nearly perfect and his impressive statistics speak for themselves

In what does the Pauchet method differ from the Hustinx Montenegro technic? Pauchet dissects the sleeve to diminish the volume of the duodenal stump while Hustinx and Montenegro use the dissected cylinder preferring to ligate it at its base and insure a safer closure of the stump

TACTICAL VARIATIONS OF THE ALFREDO MONTEIRO SCHOOL

Is it necessary to diminish the volume of the stump in order to facilitate its closure? I do not believe so

Would a more secure closure be obtained by

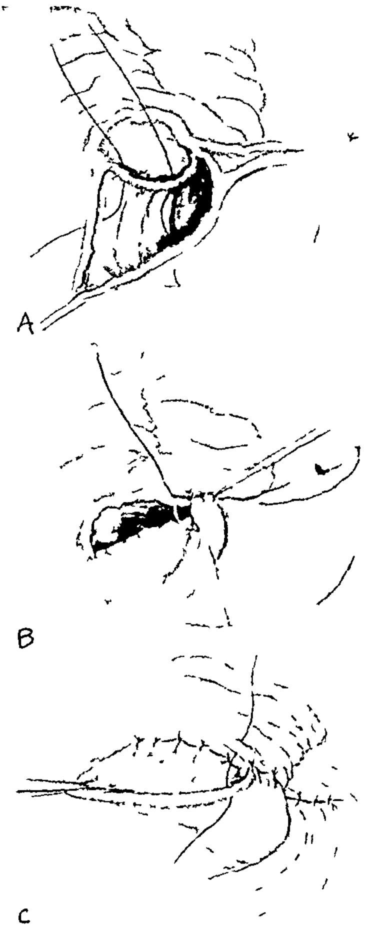

Fig 3 —Closure of duodenal stump *A*, first layer of interrupted sutures inserted through distal margin of ulcer and all layers of edge of anterior wall *B* second row inserted through proximal margin of ulcer and a seromuscular fold of anterior wall Cut edge of duodenocolic ligament closed *C*, third row inserted through capsule of pancreas and another more distal seromuscular fold of anterior wall

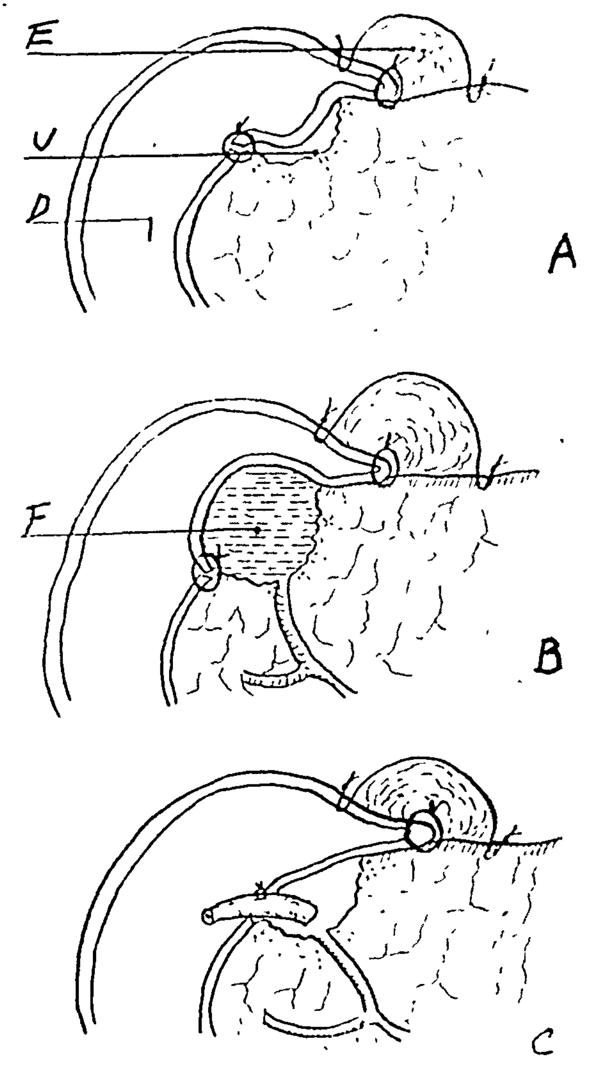

Fig. 4.—Closure of duodenal stump. *A*, longitudinal section of atypical ulcer closure; *D*, duodenum; *U*, ulcer; *E*, epiploon. *B*, atypical closure in presence of accessory pancreatic duct with effusion of pancreatic juice into surgically closed space; *F*, pancreatic fluid collection. *C*, rubber tube inserted and fixed to anterior wall of duodenum to insure escape of pancreatic fluid into duodenum.

ligating the base of the devascularized cylinder? I do not believe so.

For some time I practiced detachment and dissection of the submucosa according to the technic of Montenegro, with satisfactory results. The procedure is interesting and artistic and is satisfactory as a rule, even when the common duct is involved in the fibrous tissues surrounding the ulcer. Eventually I abandoned suture of the mucosa in general. Dissection of the sleeve prolongs the operation. causes loss of blood and prolongs the septic time, all for the sake of another layer of sutures; and this layer has no practical value, since this mucosa, deprived of circulation, rapidly becomes necrotic.

The secret of a good duodenal closure lies in mobilization of the anterior wall, which sometimes requires freeing from its parietal attachments (Kocher's maneuver). To be sure of avoiding injury to the common duct, when operating in a fibrous area surrounding the ulcer, place a T-tube into the common duct (Lahey) or locate it by means of preliminary liberation of anterior duodenal wall.

In this clinic it is routine, in the case of a penetrating ulcer, to divide the stomach and *perform a gastrojejunal anastomosis before* tackling the ulcer itself. The stomach having been freed, one can more safely approach the fixed part of the duodenum. With small and medium-sized ulcers it is possible to avoid exposing the crater. This is accomplished by placing a forceps below the ulcer, from the

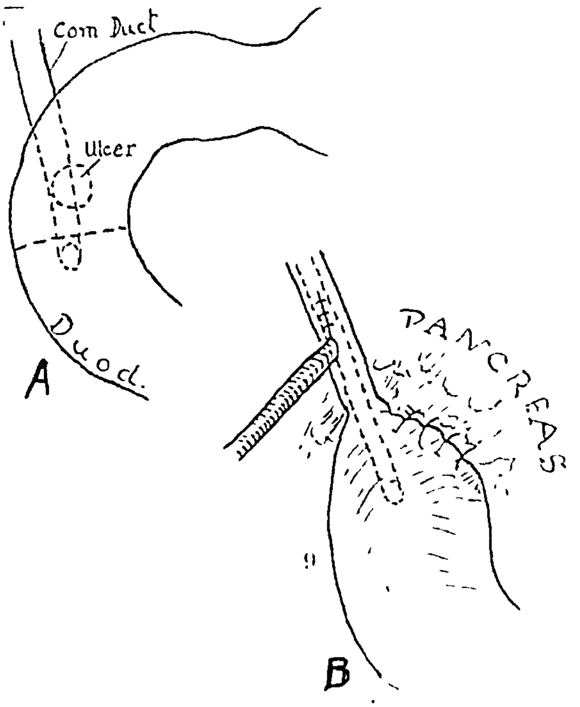

Fig. 5.—Lahey's method of protection in posterior wall ulcer adherent to common duct. *A*, location of ulcer in relation to common duct; level of dissection marked by dotted line. Ulcer crater apparently far proximal to line of resection. *B*, T-tube prophylactically inserted in common duct to avoid obstruction of duct by suture or by inverted stump. Final result.

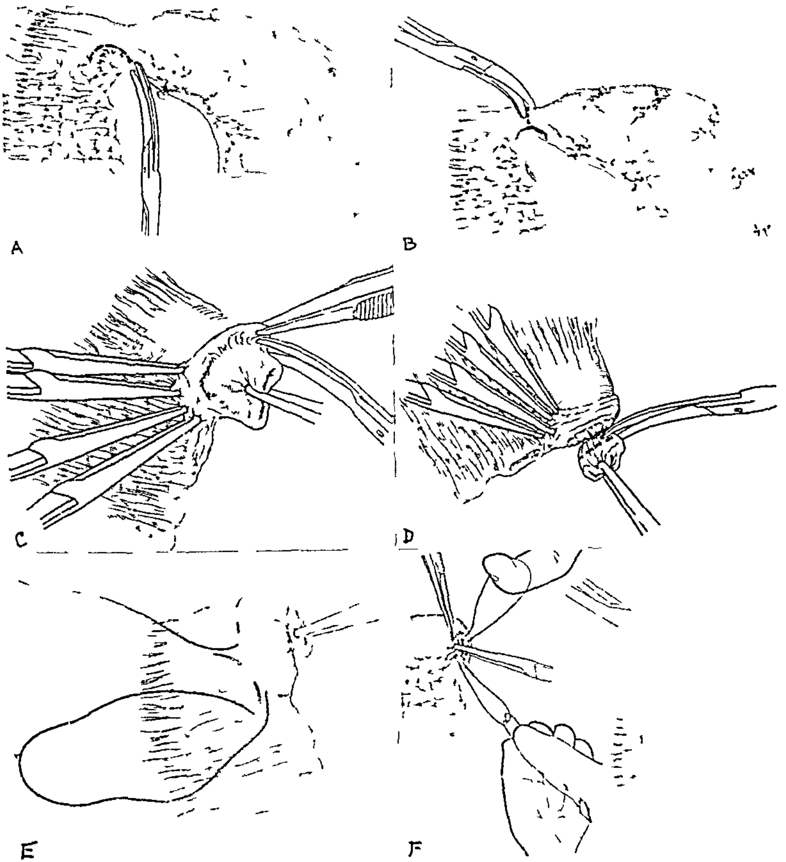

Fig 6—Montenegro's technic of submucosal detachment *A* division of duodenum bypassing the crater *B* completion of division of circumference of duodenum *C* submucosal detachment *D* cylinder dissected and ligated and excess resected *E* purse string suture for anterior duodenal wall and sheath of pancreas *F*, knotting of purse string suture, completed by epiploplasty

free to the attached borders of the duodenum and dividing the same above the instrument This maneuver is followed by resection of the proximal part of the duodenum, bypassing the crater

At this point one of three variations—Monteiro's, Barreto's or Freitas'—may be used

Monteiro Variation—Having applied the seromuscular suture over the forceps clamping the duodenal stump, I place a fringe of epi

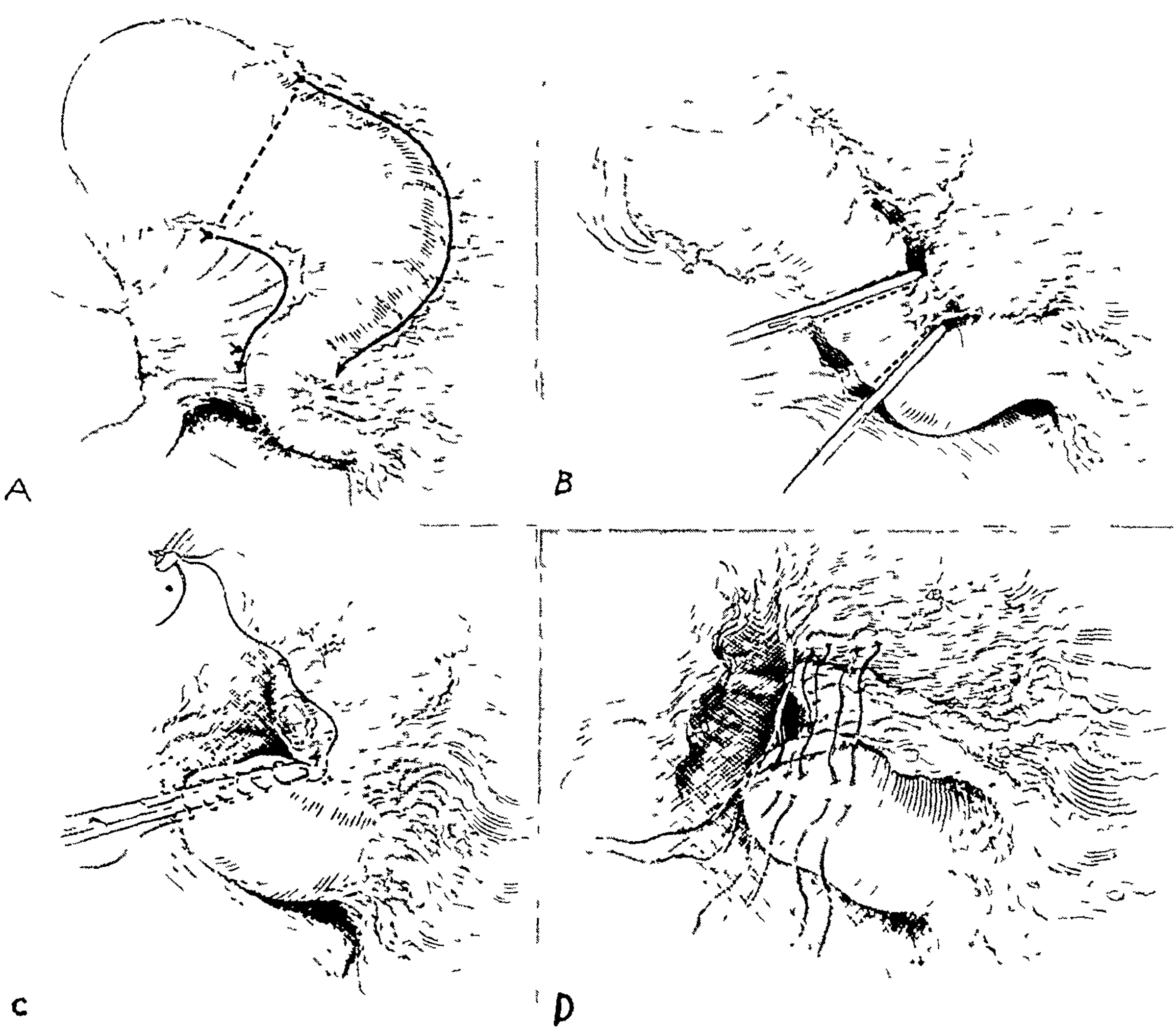

Fig 7—Monteiro's variation. *A*, devascularization of stomach. Dotted line denotes previous division of stomach, immediately followed by gastrojejunal anastomosis. *B*, the part of stomach mobilized and to be resected allows easy access to the duodenum. Postion in which forceps are applied and ulcerous area are visible between them. *C*, withdrawal of proximal part of duodenum and closure of stump over forceps. *D*, after closure of duodenum, a segment of omentum is drawn over the crater; anterior wall of duodenum and sheath of pancreas sutured together over the omentum. Then a part of the segment of omentum is turned back over and sutured to the duodenum and the pancreatic capsule (loop epiploplasty)

ploon between the stump and sheath of the pancreas, and follow this by "U" stitches uniting the anterior wall of the duodenum to the capsule of the pancreas; the segment of omentum mentioned is then passed over this suture line and attached to the pancreatic capsule and the duodenal wall.

Barreto Variation[9]—After dividing the stomach and performing the gastrojejunostomy, I retract the stomach and proceed with freeing the duodenum; first along the lesser curvature and posteriorly, then along the anterior surface, the free margin and the posterior surface. Having thus localized the ulcer, I try to create a passage between the duodenum and the pancreas below the lesion. Difficulties may be encountered because of infiltrated tissues and the presence of duodenopancreatic vessels. To overcome this difficulty, I place a forceps obliquely from the free margin to the attached margin of the duodenum, avoiding contact with the pancreas as far as possible and reaching to an area below the ulcer. A strong, straight forceps is applied directly above the first one. If the duodenum can be freed on all sides, the forceps are applied with more precision and remain throughout the period desired. From the superior end of the ulcer to the free margin I place another forceps. (An elbowed instrument is easier to manipulate.) The coprostasis completed by the forceps I continue by isolating the segment of duodenum corresponding to the ulcer. Then, with a diathermic blade, I proceed to resect the affected area. In this manner I obtain an obliquely divided duodenum, closed off by two superimposed hemostats. I then adjust the inferior hemostat, once in control of the duodenal opening, and withdraw the superior one. With a simple No. 1 catgut I perform a simple continuous suture over the forceps, following Mayo's technic. This done, the ends are tied together, the two points of the stump being turned toward the base. Separate stitches are then applied with No. 000 silk or fine cotton thread from one surface to another, invaginating the stump. The stump is then drawn over the ulcer site and sutured to the sheath of the pancreas Finally a segment of pedunculated omentum is applied over the duodenopancreatic suture.

Josias de Freitas Variation.[10]—Figure 8 shows the operative procedure. My collaborator differs in one point—that is, in not suturing the stump to the capsule of the pancreas The reason is that these stitches pass through pancreatic tissue and frequently provoke hyperglycemia. This has been duly proved by myself but appears to be of little importance.

In conclusion, it can be stated that it is not always possible to isolate the duodenum without previously exposing the ulcerous crater. In such cases it is impossible to proceed in the clean manner heretofore described. The best procedure then is to suture the duodenal mucosa without any dissection, then fix the anterior duodenal wall to the sheath of the pancreas, and to follow these steps with a complementary epiploplasty.

SUMMARY

The author discusses closure of the duodenal stump in cases of ulcer of the duodenum penetrating into the pancreas, referring especially to his personal experience. He cites five phases of technic in simple cases: (*a*) closure with two layers of sutures (common technic); (*b*) Mayo's technic; (*c*) Finsterer-Montenegro and Doyen technics (ligature and purse-string suture); (*d*) avoidance of the septic closed cavity; and (*e*) use of the small modified Von Petz clamp devised by Eugenio de Souza.

As to penetrating ulcers, the author considers three periods: (*a*) the period of gastroenterostomy; (*b*) the period of resection by exclusion (Finsterer); and (*c*) the Pauchet-Nissen resection. He favors resection, and considers the Finsterer technic not satisfactory.

The author discusses variations of the Pauchet-Nissen method, including the Hustinx-Montenegro dissection and the three variations of the Monteiro school.

RESUMEN

El autor examina el cierre del muñón intestinal en los casos de úlceras del duodeno

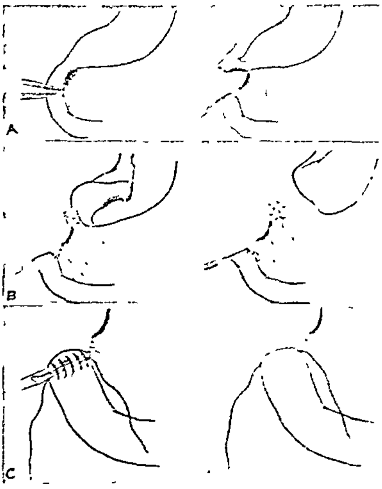

Fig. 8.—Josias de Freitas' variation. *A*, two forceps placed directly under ulcer after devascularization of stomach and duodenal mobilization (avascular zone). *B*, division of duodenum between forceps and resection of proximal part, bypassing crater. *C*, total suture over forceps (transfixing or not), followed by second layer of sutures, nonperforating, invaginating the first. Completed by epiploplasty.

penetrantes en el páncreas reficiéndose de un modo especial a su experiencia personal. Menciona el autor las cinco fases en que se divide la técnica en los casos sencillos: a) cierre mediante dos estratos de suturas (técnica corriente); b) técnica de Mayo; c) técnica de Finsterer-Montenegro y Doyen (ligadura y sutura en cordón de cierre de bolsa); d) manipulación operatoria para evitar la formación de un cavidad séptica cerrada; y, e) empleo de la pinza pequeña de Von Petz modificada que ha sido desarrollada por Eugenio de Souza.

En cuanto a las úlceras penetrantes, el autor examina tres períodos: períodos de la gastroenterostomía; b) período de la resección (Finisterer); y c) resección de Pauchet-Nissen. El autor favorece la resección y considera que la técnica de Finsterer no es satisfactoria.

El autor examina las variaciones del método de Pauchet-Nissen incluyendo la disección de Hustinx-Montenegro y las tres variantes de la escuela de Monteiro.

RÉSUMÉ

Cet auteur décrit la suture du tronçon duodénal dans des cas d'ulcère du duodénum pénétrant dans le pancréas, considérant surtout ses propres cas. Il décrit les 5 stades de sa technique dans les cas simples: (a) fermeture avec deux rangs de sutures (technique commune); (b) technique de Mayo; (c) techniques de Finsterer-Monténégro et de Doyen (ligature et suture en bourse); (d) prévention de la cavité septique fermée et (e) emploi de la petite pince Von Petz modifiée par Eugenio de Souza.

Quant aux ulcères pénétrants, l'auteur considère trois phases: (a) la phase de la gastroentérostomie; (b) la phase de résection par exclusion (Finsterer) et (c) la résection de Pauchet-Nissen. Il préfère la résection et considère la technique de Finsterer non-satisfaisante.

L'auteur discute les variations de la méthode Pauchet-Nissen y compris la dissection de Hustinx-Monténégro, et les trois variantes de l'Ecole de Monteiro.

RIASSUNTO

Discute la chiusura del moncone duodenale nei casi di ulceri penetranti nel pancreas, con speciale riguardo alla propria esperienza. Cita cinque metodi applicabili ai casi non complicati: a) chiusura con due piani (tecnica comune); b) tecnica di Mayo; c) tecnica di Finsterer-Montenegro e di Doyen (legatura e sutura a borsa di tabacco); d) eliminazione di una cavita' settica chiusa; e) uso di una piccola pinza modificato di Von Pitz, ideata da Eugenio de Souza.

Per quanto riguarda le ulceri penetranti l'A. prende in considerazione tre procedimenti: a) gastroenterostomia; b) resezione per esclusione (Finsterer); c) resezione secondo Pauchet-Nissen.

La resezione sarebbe il metodo migliore: ma l'A. non si dichiara favorevole alla tecnica di Finsterer. Egli discute possibili variazioni del metodo di Pauchet-Nissen, includendo nella discussione la dissezione secondo Hustinx-Montenero e tre variazoni secondo la scuola di Monteiro.

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Polyposis of the Stomach with Intussusception into the Duodenum

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POLYPOSIS of the stomach is comparatively rare At the time when the case here described came under surgical treatment there had been only 100 cases reported in the literature (Sinclair, *British Journal of Surgery*, 1933) The condition may present a variety of symptoms and cause difficulty in diagnosis It is therefore incumbent on every surgeon to publish details of any such case so that the symptoms may be made clearer

REPORT OF CASE

Harriet M, a married woman aged 63, was admitted to St Mary's Hospital, Paddington, on Jan 21, 1933, with a history of abdominal pain and vomiting after taking food for the past two years. Five days before admission she had had a more violent attack of vomiting, and her medical attendant (the late Dr D D Rosewarne) had observed a sausage shaped swelling, which he attributed to duodenal spasm, he commented that the swelling disappeared under the influence of morphine and belladonna Since that attack she had been unable to take solid food without vomiting almost at once Vomiting was always followed by epigastric pain There had been no hematemesis, and the bowels were open regularly

The patient was thin and rather feeble. Examination of the blood showed 4,300,000 red cells per cubic millimeter, but the value for hemoglobin was only 75 per cent

Examination showed a lax abdominal wall, with some deep tenderness in the left hypochondrium A palpable but not easily definable lump was observed below and to the left of the umbilicus There were no other notable physical signs

Roentgen examination of the stomach revealed a persistent filling defect, which involved the whole of the pyloric portion of the stomach The roentgenologist had no doubt that this was due to carcinoma There was an eight-hour residue in the

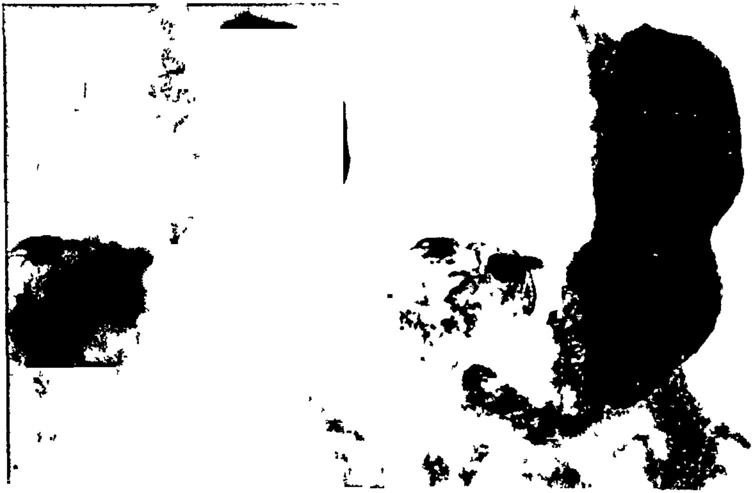

Fig 1—Roentgenograms taken after barium meal

stomach. The passage of the barium through the remainder of the intestine presented no abnormal features.

The preoperative diagnosis was carcinoma of the stomach, and on February 9 the abdomen was explored, with the patient under general anesthesia. The stomach was extremely vascular. There was a swelling involving the pyloric part of the stomach and the first part of the duodenum. On palpation one felt something like a polypoid growth. Partial gastrectomy was performed by the Billroth I method. The duodenum was much dilated, and the growth had been intussuscepted into the duodenal lumen. There were no complications after operation, and the patient left the hospital on March 6. She remained comparatively well for some years but still suffered occasionally from indigestion.

The pathologic diagnosis was multiple adenomatous polypi of the stomach.

COMMENT

It is clear that the difficulty in this case was caused by intussusception of the growth and the pyloric part of the stomach into the duodenum. The duodenal swelling observed by the patient's physician and its disappearance under the influence of belladonna and morphine can only have been due to such an intussusception. The accompanying illustration shows that the duodenal lumen was dilated to a size as great as that of the pyloric part of the stomach.

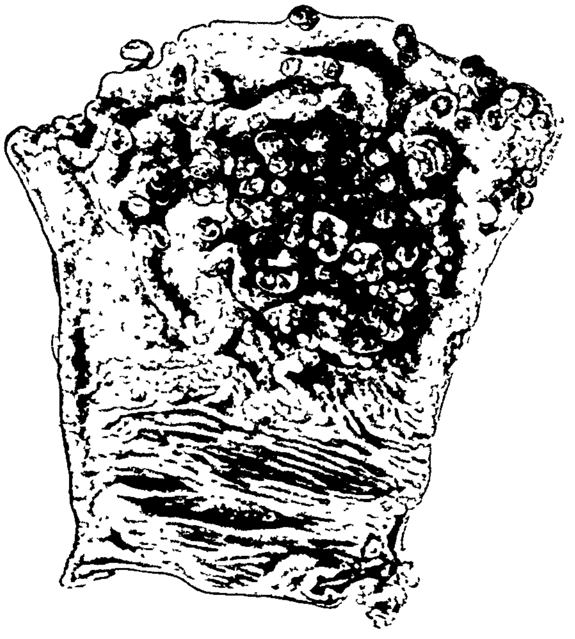

Fig. 2.—Polypoid mass intussuscepted into duodenum.

The recurrence of "indigestion" after operation may well have been due to the growth of more polypi, for it will be noted that the section of the upper part of the stomach cut across a few scattered polypi.

The mistaken diagnosis of carcinoma was natural when the roentgen film showed a complete filling defect in the pyloric region. This must have been due to the intussusception occluding the first part of the duodenum. If another film had been taken later it is likely that the cluster of polypi would have shown up as a partial filling defect in the pyloric antrum.

SUMMARY

A case of polyposis of the stomach in a woman aged 63 is reported, in which a mistaken roentgen diagnosis of carcinoma was made preoperatively. On laparotomy it was found that a large polypoid growth had been intussuscepted into the lumen of the duodenum. Operation was followed by an uncomplicated recovery. The pathologic diagnosis was multiple adenomatous polypi of the stomach.

RÉSUMÉ

On rapporte le cas d'une importante excroissance polypoide de l'estomac, intéressant le duodenum. On fit à la radio, un diagnostic erroné de carcinoma. L'opération fut suivie d'une guérison sans complications.

RESUMEN

Se ha descrito un caso de tumor poliposo gastrico con intususcepcion en el duodeno, diagnosticado erroneamente por el radiólogo como un carcinoma. La convalecencia despues de l'operación fué normal.

Basic Factors in Scientific Research*

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In the prologue to *Gargantua* François Rabelais[1] says:

> Did you ever see a Dog encountering some Marrow bone? He is, as Plato says (Book II, *The Republic*), the most philosophical animal in the World. If you have seen him, you may have noted with what Devotion he watches it, with what Care he guards it, how fervently he holds it, with what Prudence he gobbets it, with what Affection he breaks it, and with what Diligence he sucks it. What induces him to do this? What is the Hope of this Research? What good does he set before him? Nothing more than a little Marrow.

THE majority of scientific investigators are seeking just that—just "a little Marrow." Few indeed seek to discover accidentally as Columbus did a whole New World. Few expect to see their names emblazoned along with those of Pasteur, Ehrlich and Freud. They do what the Germans used to call somewhat apologetically an "Arbeit", and if it gets published they are satisfied. Moreover they can always send out reprints.

As the middle of the twentieth century approaches the creation of a National Science Foundation has received the dignity of special mention in a Presidential message. "Research" has become the most potent word for use in the solicitation of funds for a great variety of purposes. The progress of science is recognized as the key to providing more and more of all that is good for more and more people. We may well inquire as to the basic factors involved in promoting, encouraging and supporting research. Many of the distinguished investigators of the past left records of the paths by which they attained their achievements. Their writings provide hints as to what we may do toward intensifying the speed of research and broadening its scope. Perhaps the secret lies in the laconic three word message John Hunter wrote to Edward Jenner when the latter advanced his views on hibernation in the hedgehog: "Don't think, try!" Simply to experiment is not, however, the answer. Sir Walter Langdon Brown said: "John Hunter was first to regard medicine as a branch of experimental biology. His famous aphorism 'Don't think, try!' may have been misinterpreted, but never more sardonically than by a friend of mine who commented that 'out of respect to John Hunter the medical profession for more than a century had been trying not to think.'"

During the last ten years I have been privileged to sit with various boards and committees of the National Research Council, particularly in the Division of Medical Sciences; also on the scientific advisory boards of such scientific foundations and groups as the National Foundation for Infantile Paralysis, the American Heart Association, the Arthritis and Rheumatism Foundation and the various scientific councils of the American Medical Association. For some two years I have been associated with the Committee on Veterans Medical Problems. In these capacities I have had opportunity to consider, along with many of the leaders in science in the United States, hundreds of applications for grants of funds to support research in leading universities and scientific institutes. Invariably questions arise: What is research? Can this man do research? Has he adequate facilities and personnel to undertake a project such as the one proposed? Has he allowed for overhead? Are we supporting teaching in that university? What other grants does this man get? Occasionally, is he asking for enough money? Has he already got a biochemist? Who is his statistician?

I have been conducting a little bibliographic or literary research of my own to find the essential qualities that characterize an investigator, the mechanisms by which research of note has been accomplished, the habits of thought, reasoning and logic—the mental processes—that result in great inventions and discoveries. I wish that some formula could be derived from these studies to guide deans of

ls, professors of the biological

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*Address to the Chicago Literary Club Jan [illegible] 1950 sciences, directors of research institutes, and philanthropists of good will in selecting investigators or projects for investigation.

At this point, if I were to follow the custom of many writers, I could introduce the word "semantics" and call for definitions of science and of research. By a process of exclusion, I could, no doubt, toss out of consideration tons of theses published in pursuit of the degree of master of some science or the degree of doctor of philosophy. I have observed theses on "The Nocturnal Attitudes of the Cockroach," and on "The Drinking Habits of the Honey Bee"! As long as universities grant the degree of doctor of philosophy for theses built on questionnaires, weird projects will entice investigators. We must not be snobbish, however, in our choice of subjects for investigation. The lowly cockroach, bed bug and louse have already achieved criminal importance as dispensers of disease, and we cannot neglect them.

President Conant, in a recent group of essays,[3] defined science by saying that it "emerges from the other progressive activities of man to the extent that new concepts arise from experiments and observations, and that new concepts in turn lead to further experiments and observations." This definition indicates the continuously dynamic character of science. As for the so-called "social scientists," President Conant considers the field of their observations, the duration of their studies and their accumulation of facts so insufficient that he prefers to call them social philosophers, thus saving their dignity and at the same time placing them near the top of the intellectual caste system of the universities, along with the mathematicians.

For some years I have emphasized a point on which there is general agreement, namely, that the progress of medical and related sciences depends in large measure on the invention of new devices and systems of measurement which extend the senses of the investigator beyond the limitations established by the nature of man or by previous inventions. More than fifteen years have passed since Professor J. B. S. Haldane[4] wrote:

> Research, although at first sight so different from invention, consists largely of the design and perfection of apparatus for observation and measurement. A few months ago I met Professor Hertwig who was the first to observe the actual process of fertilization by the fusion of the nuclei of an egg and a spermatozoon. About a third of modern biology is based on this simple fact which every educated person today takes for granted. My wife asked me whether I thought there were many discoveries at once as simple and as important to be made in the realm of biology by mere observation. Personally I do think so, but they will depend on the invention of new means of observation as powerful and ingenious as the microscope, which had undergone two hundred years of development when Hertwig made his great discovery.

Consider in this connection the extension of medical knowledge resulting from the invention of the watch, the manometer, the stethoscope, the ophthalmoscope, the laryngeal mirror, and the electric light. How many thousands of medical investigations have depended on the simple application of such devices to a variety of diseases and disorders! What a vast product of research has resulted from the invention of new culture media, or from any of the instruments that write records of function of such organs as the stomach, the heart, the lungs and the muscles! What would the physiologist be without his kymograph, the cardiologist without his electrocardiograph, and, more recently, the neurologist without his electroencephalograph? The sense of sight has been immensely prolonged and extended by the ophthalmoscope, the rhinoscope, the otoscope, the esophagoscope, the gastroscope, the cystoscope, the proctoscope, the peritoneoscope, the bronchoscope, the microscope and the telescope. As each of these devices has appeared, a new specialty has developed. Floods of manuscripts, simply recording new observations, are catalogued as research. The basal metabolic apparatus, the roentgen ray and the electrocardiograph have created new specialties and specialists. In their strivings to make their specialties more truly scientific the psychologists and the psychiatrists invent new technics of measurement such as the Binet-Simon test, the Rohrschach test, the Minnesota multiphasic personality test, the draw-a-man test, and many others which seem sometimes to offer more information about the tester than about the testee. A few radioactive isotopes and a Geiger counter can make any doctor a research man in the field of atomic energy and physiology.

As I have already emphasized the words "scientific research" have become a slogan with which to conquer Sir Farquhar Buzzard[5] eminent British neurologist said in his Maudsley Lecture

> The man in the street is familiar enough with the term "scientific research, but has little conception of how scientific observations are registered and controlled, how deductions are tested and hypotheses scrapped He lives in another world and is content to welcome a ' new discovery sensational enough to attract notice in the press, as *a bolt from the blue* or as a *species of miracle*, and to accept it without interest in its origin its evolution, or the authority on which it is proclaimed

The education necessary for an investigator includes training in a number of fields among which English composition and mathematics are certainly not the least essential The education of the investigator must be exceedingly broad embracing not only training in the scientific method, but also some knowledge of history, economics philosophy art anthropology, and as many different basic sciences as he can possibly encompass Cultural education is vital to the highest achievement Some have insisted that the training offered by the German gymnasium was the ideal preparation for the investigator in the field of medicine and that this preparation accounted for the leadership held by central Europe in medical investigation in the middle of the nineteenth century The subject has been extensively debated and is as fresh today as when it was first tossed into the arena of scholastic consideration Chancellor Robert M Hutchins[6] in a report on his twenty years of administration in the University of Chicago writes

> The American University in its present form is the outgrowth of the justifiable enthusiasm felt by the men of the nineties for the universities of Imperial Germany The extreme specialization of the German universities and their devotion to research, however, were educationally possible and socially tolerable only because of the humanistic Gymnasium, which laid the foundations of liberal education upon which the German university was erected
>
> In the United States the college, upon which the graduate school was imposed and the high school, upon which the college rested were disintegrating at about the time that universities on the German model began to arise The American university today is a great many things that the German university never thought of being an athletic establishment a health resort, a vocational school, and a place to have a good time and acquire the social graces But in so far as research is concerned, the American university is a *ci devant* German university Unfortunately, it is a German university without its foundations

As one proceeds with Mr Hutchins report one finds him urging that the vocational object of professional schools is accidental rather than essential, that "the way to learn how to practice anything is to practice it ', that ' the University has held that all its professional schools should be devoted to research' , that "the University of Chicago Medical School is a full time research institution All the members of the faculty derive their income from the University in the form of salary The patients' fees go to the University and not to the doctors ' All this offered in a sort of triumphant crescendo seems to be a challenge, a defense of the system ! Do these details of administration and university economics really have anything to do with the basic factors of scientific research ? No doubt the conditions under which research is prosecuted, and the environment of the investigator affect the facility with which the work is conducted as well as the extent of production of scientific facts and of well trained personnel From the point of view of genetics they may concern even the breeding and rearing of investigative geniuses I doubt however that full time or part time all salary or part salary royalties from books or no royalties, income from patients or no income are basic factors They did not concern Ramon y Cajal Claude Bernard or Rene Laennec

THE BIOGRAPHICAL AND AUTOBIOGRAPHICAL EVIDENCE

Dr Walter Bradford Cannon[7] in his autobiographical study of the qualities that make for leadership in investigation begins by enumerating some of the factors that may hinder rather than help

> I have been more and more impressed by the occasional lack of one or another of the essential qualities in a man, that spoils his otherwise excellent equipment in mind and character As an investigator he may, for example, be rich in suggestive ideas and yet be indolent and therefore sterile he may be a hard worker but secretive about his results and suspicious of his fellow

> workers, so that he is despised by them; he may be an earnest experimenter but inconsiderate of his helpers, and therefore he may find that help is begrudged him; or he may be prone to display an attitude of superiority and consequently be subjected to derision, expressed or silent. Sometimes an investigator's excellence in important regards is so great that it over-balances his defects. I have heard of an eminent scientist who, after weeks of intense and exhausting labor on a difficult problem, would break away in a disgraceful carouse. His escapades were tolerated because of his outstanding discoveries.

Cannon holds that "the experimental method, in which the conditions to be observed are held under control, is in the main the distinguishing feature of modern science. . . . What the experimenter is really trying to do is to learn whether the facts can be established which will be recognized as facts by others and which will support some theory that in imagination he has projected. . . . The experimental method requires ingenuity and skill in contriving appropriate devices for securing the evidence needed to learn whether an idea is valid or not." And here let us not confuse the tools of science with science itself! Mathematics, as was pointed out by President Conant, is the language of science. Similarly, ability to describe the experiment and the hypothesis on which the experiment is based is part of the investigator's armamentarium. To quote Cannon again: "The scientific observer should be able to write a clear and definite report of his aims, his methods, his results and his conclusions." In his consideration of the fitness of an investigator for research, Professor Cannon concludes:

> In listing the traits which have seemed to me important for a career of investigation—curiosity, imaginative insight, critical judgment, thorough honesty, a retentive memory, patience, good health, generosity, and the rest—I have not attempted to weigh their relative values. Anyhow, that would be difficult. A beginner, who seriously plans a life of productive scholarship, should not be disheartened if he thinks his qualifications do not meet requirements. Training and practice may not lead to perfection, but they will surely compensate for early inadequacy.

Sir James Mackenzie is perhaps the most conspicuous example of the doctor of medicine who has contributed notably to science. He was an investigator in physiology, cardiology and medicine. He had great difficulty in achieving the necessary scholastic diplomas to permit him to enter his chosen field. "I was not taught how to study," he wrote, "and had great difficulty in passing my examinations in my early years." Many years later, after he had achieved renown as a doctor of medicine and as an investigator, he wrote:

> There are two very distinct qualities of the human mind: memory, and the power of reasoning. The earliest to be developed is that of memorizing, and this can be cultivated with great ease. The power of reasoning is quite different, although, no doubt, memory takes a part. When we look at a great number of students, we discover that this power of memory is greatly developed in a few, and that all our educational methods are devoted to its cultivation. Examinations are specially contrived for the purpose of discriminating those with the best memories, and to them all the honors and prizes are given.
>
> The individuals who, on the contrary, possess *more of the power of reasoning than their fellows,* receive no consideration. There are minds which have a difficulty in remembering isolated facts, but if these facts are related in some consecutive manner, they can not only remember them but also appreciate their bearing on one another. But this type of mind is slow in acquiring knowledge, and in our present day methods of education less and less encouragement is given to this type of student. His peculiar powers are never developed, and their presence is never suspected.
>
> The outcome of the teaching of today is to hail the student with superior powers of memorizing as the brilliant student and the one with the great future. The consequence is that his path from the outset is made easy for him. Bursaries and scholarships fall to his share, and before he has acquired any experience, he is appointed to a teaching post. In the absence of any knowledge acquired from the results of his own observations, he is forced to teach that which he was himself taught, and, as he cannot discriminate between truth and superstition, he hands both on to his students. As years pass he comes to believe what he has taught is true and may even grow impervious to new ideas which are contrary to the beliefs he has been expounding.[8]

When Mackenzie wrote that statement Pasteur and Lister were waging a battle on behalf of the concept that living organisms cause disease. Is it not strange that a young physician with a character and mind like that of Mackenzie, launched into medical problems in the midst of such a revolution, should become himself somewhat of a revolutionist? The environment of the investigator does of course influence his research—but it is not the most significant factor.

In his autobiography, Ramon y Cajal,[9] greatly distinguished as an investigator of the nervous system, also listed some factors which he found important for those who devote themselves to scientific research.

> It is obvious that, with much boldness and presumption, I attributed to myself, *a priori*, some aptitude for scientific investigation. My only excuses are my youth and, especially, the psychological fact that without a certain lack of modesty nobody accomplishes anything important. Anyway, as I adventured in the objective examination of biological problems, my faith in myself increased, for it seemed to me that the presupposed qualities were confirmed *a posteriori*, among the most outstanding being patience bordering upon obstinacy in the mastering of histological methods, dexterity and skill in replacing expensive experimental arrangements with simple and improvised contrivances, indefatigable persistence and enthusiasm for the observation of facts, and finally, best of all, open mindedness for sudden changes of opinion and correction of errors and preconceived ideas, all of these qualities are naturally of second rank, but adequate for the work undertaken. Besides, in this work, which my colleagues and friends considered wearisome, I found the most fascinating of amusements. When I was eagerly occupied at the eye piece, the winter evenings passed rapidly, without my missing theatres or social gatherings. I remember that once I spent twenty hours continuously at the microscope watching the movements of a sluggish leucocyte in its laborious efforts to escape from a blood capillary.

Here it seems to me, we begin to recognize essential factors for scientific research. The worker must find interest, joy, excitement, pleasure, or emotional release in his task. Boredom in the course of investigation would be a fatal toxin.

If the point just made requires any laboring, let me cite in evidence a few paragraphs from the autobiography of Sigmund Freud.[10] After indicating that his religion prevented his acceptance in the University community, Freud continues:

> These first impressions at the University, however, had one consequence which was afterwards to prove important, for at an early age I was made familiar with the fate of being in the opposition and of being put under the ban of the "compact majority." The foundations were thus laid for a certain degree of independence of judgment.
>
> I was compelled, moreover, during my first years at the University, to make the discovery that the peculiarities and limitations of my gifts denied me all success in many of the departments of science into which my youthful eagerness had plunged me. Thus I learned the truth of Mephistopheles' warning:
>
> Vergebens, dass ihr ringsum wissenschaftlich schweift,
> Ein jeder lernt nur, was er lernen kann.
>
> At length, in Ernst Brucke's physiological laboratory, I found rest and satisfaction—and men, too, whom I could respect and take as my models: the great Brucke himself, and his assistants, Sigmund Exner and Ernst von Fleischl-Marxow. With the last of these, a brilliant man, I was privileged to be upon terms of friendship. Brucke gave me a problem to work out in the histology of the nervous system, I succeeded in solving it to his satisfaction and in carrying the work further on my own account.

Freud continues, pointing out that he was negligent in pursuing his medical studies, so that it was not until 1881 that he took his somewhat belated degree as Doctor of Medicine. Nevertheless, his first research project pointed him definitely toward further interest in the anatomy and physiology of the nervous system and ultimately to pathology and interest in nervous diseases.

Let us see how another great genius of medical research came into this field. In 1834 Claude Bernard in Lyons, France had served as a practical pharmacist and had written a play and various other literary trifles. He took his play to Girardin at the Sorbonne, who recognized the literary talent but urged the young man to study medicine as a surer means of gaining a livelihood. In the fifth year of his studies, after serving as externe at the Hospitals he was appointed "interne" and Providence ruled that he should be allotted to Magendie, who was Professor of Medicine following Laennec.[11]

> Following the old tradition, it continued to be recognized that the duty of a Professor holding a chair in the College was not to give didactic lectures suitable to an ordinary student, but rather to use the post as an instrument of research, and to expound new ideas to those who were already advanced in their studies.
>
> * * *
>
> Magendie's contributions to physiological science were many and great, the exact and full proof which he brought forward of the truth which Charles Bell had divined rather than demonstrated, that the anterior and posterior roots of nerves hav lly different f s, which i tion of t

> ology of the nervous system, is enough by itself to mark him as a great physiologist; and he did much else besides. But all his lasting results, even when their fullest value is allotted to them, are incommensurate with his activity. If he did many experiments which bore adequate fruit, he did also many which were misleading and many which were useless. For his worship of the experimental method came very near to being idolatry. Repelled by the sterile discussions in which the vitalists and other doctrinaires of the day spent their intellectual activity, he was driven towards the other extreme, and arrived almost at the position of substituting experiment for thinking.

Thus the impelling force that drove Claude Bernard into research seems to have been a combination of chance or fate, which gave him opportunity, and early and prolonged contact with a great master, who imbued him with belief in the experimental method of acquiring knowledge and facts.

In Erwin F. Smith's introduction to Duclaux' life of Pasteur,[12] emphasis is placed again on such factors. Here is a quotation from Roux, who probably knew best the great founder of microbiology:

"Pasteur followed his idea as the magi their star. He was a priest; priest of the idea."

And Smith continues:

> In him, instinct or rather bold intuition, dominated reason. His disdain for traditional knowledge and philosophical speculations was scarcely concealed. Trusting only in experiments, he knew how to outstrip them and more than once went far beyond them.

Duclaux' famous biography[12] is subtitled "The History of a Mind." To love of the experiment must be added the quality of imagination.

> That which puts him outside of comparison is the fact that he loved great horizons, knew how to discover them and to make himself a part of them; that he saw at a distance and through the mists, more clearly than anyone else, the high summit he must attain to dominate the unknown and promised land. This was his rare gift and the secret of his power. But once seen he had wings to reach it. One might believe, considering the originality, the simplicity *and the unexpected in* his solutions, that they were spontaneous and in the nature of happy discoveries, accomplished without effort and by a sort of divination. Such surely was not the case with Pasteur's. If he was a discoverer it was first of all because he was a silent man and an obstinate one.

THE ELEMENT OF CHANCE

In the history of scientific investigation the element of chance, or accident, or "hunch" appears repeatedly. Sir Alexander Fleming—and no doubt some thousands of bacteriologists before him—had seen culture plates in which growth of a mold had prevented the growth of pathogenic bacteria. All had seen it—but one day Fleming noted it. Banting, an orthopedic surgeon, was reading in a medical library, probably just for the fun of it, when he chanced on a sentence that started him on the search that resulted in insulin. Cannon reports a study of "hunches" made by Platt and Baker among chemists. "Assistance from a scientific revelation or a hunch in the solution of an important problem was reported by 33 per cent; 50 per cent reported that they had such assistance occasionally; and only 17 per cent, never." The hunch arrives only after long study and meditation and only to a prepared mind. Professor Cannon credits to hunch his interpretation of the significance of bodily changes which occur in great emotional excitement, such as fear or rage. Such also was Otto Loewi's demonstration of a chemical agent liberated at the ends of nerves. Claude Bernard was led to the process called "internal secretion" by such a hunch.

Professor Cannon considers that unfavorable conditions toward developing a hunch are mental and physical fatigue, petty irritations, noise, worry over domestic or financial matters, states of depression, and strong emotions. Other unfavorable conditions listed include being driven to work under pressure and frequent interruptions or the feeling that interruption may occur at any moment "as in the demands of administrative duties." As far as I can determine, these are unfavorable conditions for any creative effort, including even the creation of human progeny. There is a great deal to keeping your mind on your work.

Hermann von Helmholtz, physician, physiologist, physicist, and philosopher of science, credits to luck his discovery of the ophthalmoscope.

> While preparing for a lecture I first hit upon the possibility of the ophthalmoscope, and then on the plan for measuring the velocity of the impulse in a nerve.
>
> The ophthalmoscope has become the most popu-

> lir, perhaps, of my scientific achievements, but I have already told the opthalmologists how luck played an incomparably greater part than my merit in this matter I had to explain to my students the theory of ocular luminosity, which stemmed from Brucke Actually, Brucke had missed the discovery of the ophthalmoscope by a hair's breadth He had only neglected to ask himself the question To which optical image do the rays returning from the luminous eye belong? Had he raised this question, he could have answered it just as quickly as I did, and the ophthalmoscope would have been discovered I was considering the problem from different angles, in order to see how I could present it most simply to my audience, and while so engaged I hit upon the aforementioned question As a result of my medical studies I was well acquainted with the difficulties confronting ophthalmologists in those conditions which at that time were lumped together under the term amaurosis I immediately set about to construct the instrument out of spectacle lenses and cover glasses for microscopic preparations At first it was still quite difficult to use, and without a firm theoretical conviction that it must work, I would perhaps not have persevered in my efforts But after about eight days I had the great pleasure of being the first to see clearly a living human retina"[12]

Before this discussion of the hunch is abandoned, Cannon's view of the gains to be derived from serendipity also merits mention The word "serendipity" was first used by Horace Walpole, who had read a fairy tale entitled "The Three Princes of Serendip" Serendip was the ancient name of Ceylon "As their highnesses traveled," said Walpole "they were always making discoveries by accident or sagacity, of things which they were not in quest of" The term may be used then relative to ideas or facts reached during the progress of research when they were not actually the ends being sought Columbus sailed from Spain searching for a short route to the Indies, he discovered a new world Galvani noticed that some frogs' legs hanging by a copper wire from an iron balustrade in his home in Bologna twitched when they were swung by the wind and happened to touch the iron This led to our acquaintance with electric phenomena to "galvanism" and ultimately to the work of Volta commemorated in the word "voltage" And so on to the telephone, the radio and finally television

The whole electrical industry seems to have been the outgrowth of a chance discovery made by a Danish physicist named Oersted "who happened to bring a wire which was conducting a strong current, to a position above and parallel to a poised magnetic needle" Charles Richet discovered anaphylaxis or allergy when testing an extract of the tentacles of a sea anemone on laboratory animals to learn the toxic dose When animals which had survived a large dose were given subsequently a much smaller dose they promptly died The ancient Greeks reportedly discovered diabetes by finding that sandals stuck to the floor when men who were urinating stepped into the moist spot that remained following a careless performance A laboratory assistant of von Mering and Minkowski noticed that swarms of flies gathered around the urine of dogs from which the pancreas had been removed Pasteur said that "chance favors the prepared mind" Adventures in ideas are not likely to be offered those who encase themselves behind the wall of established knowledge or in a fixed pattern of living and thinking

The instances here cited might be multiplied into hundreds, their value lies in the suggestions they give as to the nature of the mind that is likely to be most successful in research and investigation The story of Paul Ehrlich who failed as a medical student but achieved the Nobel prize for his discoveries in chemotherapy should be well known Wilhelm von Waldeyer himself a student of Jacob Henle both noted anatomists writes of Ehrlich

> Paul Ehrlich, a native of Strehlen in Silesia went with me to Strassburg, he was then seventeen years of age and had already received his diploma from the Gymnasium His father had recommended him to me, and I gladly received him in my house He attended my lectures and my course in microscopy Every student was assigned to a separate table equipped with a microscope and the necessary materials Four times a week for two successive hours, my assistants and I instructed the students they could then work independently at their tables as long as they wanted from nine in the morning to six in the evening During those hours when most of the students worked on their own, my assistant and I also gave instruction Soon I noticed that Ehrlich worked for hours at his table, completely absorbed in his microscopic observations Little by little his table became covered with stains of all colors One day as I saw him I asked what he was doing to make his table glitter so with all the colors of the rainbow Thereupon this young student who was only in his first semester, and who in this course was receiving his first academic

> instruction, replied: "I am experimenting." With a friendly nod of approbation, I said to him: "Well, then, go ahead and experiment some more!" Upon inspecting the preparations that he had made without any special guidance, I soon saw that in Ehrlich I had an extraordinarily talented student.

A statistical study has been made of the characteristics of scientific investigators. Truman Lee Kelley,[14] professor of education and psychology at Stanford University, studied the mental traits of men of science and the bearing of recent scientific development upon problems of education and inheritance. He observed that a small amount of time and effort will at one time yield an enormous result, while in a second instance time and effort even a thousand times greater will yield but a fraction of the earlier return. Any philanthropic foundation would give all it had of resources to be guaranteed a discovery like the celestial mechanics of Galileo or Mendel's laws of heredity. The foundations like to point with pride, just as the rest of us do. The Rockefeller Foundation was ecstatic over the fact that it once gave about eighteen hundred dollars to Fleming before he discovered penicillin. However, as Professor Kelley wisely comments, "Probably no subsidy, however great, could stimulate even Euclid, Galileo, or Mendel to make second contributions of equal moment with their greatest achievements."

Professor Kelley, utilizing the questionnaire technic, which he himself characterizes as "the weakest device that has ever obtruded its prying and at times discourteous self into the respectable field of science," developed a composite picture of the mental traits of men of science. He believes that there are no exceptions to the following:

(*a*) The great man of science is industrious, shows great mental energy, and is persistent on the trail of a great discovery.

(*b*) He questions authority, at least in the one line of his greatest achievement.

(*c*) He is apt at drawing inferences, and is therefore ingenious in making hypotheses.

(*d*) His sense of logic is sound, so that he is perspicacious in making deductions.

(*e*) He is a keen observer of natural phenomena.

(*f*) He is dependent on observed facts.

(*g*) He is inventive in the matter of techniques.

(*h*) He is rich in the variety and number of hypotheses.

(*i*) He is not "inspirational" in his chosen field; i.e., his feet are always on the ground—his hypotheses are always amenable to some test of a factual or observational sort. But he is inspirational in the sense that a vision not the common property of his fellow-men urges him on.

The following are common, but not universal, traits of the scientific man:

(*j*) He lacks personal attachment to a hypothesis—he will slay his own mental offspring, or if he does not actually kill an erroneous hypothesis that he has given birth to, he will let it die from inattention.

(*k*) He is disputatious.

(*l*) In his person much transfer of training takes place, for he adopts to one field a device, method, or hypothesis drawn from another field.

(*m*) He is versatile in his interests, and even in his native abilities.

(*n*) He is tolerant.

The following are traits which are not uncommon:

(*o*) In his person erroneous transfer takes place, for he reasons by analogy without warrant.

(*p*) He has a good memory.

(*q*) He has a good mathematical ability, even though mathematics is not his major activity.

(*r*) He has excellent motor coordination and manipulative ability.

(*s*) He has a thorough knowledge of antecedent work.

(*t*) He has a deep religious feeling.

(*u*) He is generous.

(*v*) He is precocious in his development.

The following are traits which are not unknown in men of science:

(*w*) He is egotistical.

(*x*) He is modest.

(*y*) He has hobbies.

(*z*) He is not sociable.

(*aa*) He has ancestors of more than ordinary distinction.

These are the traits derived from his own life by Professor Walter B. Cannon solely by introspective analysis. These are the traits emphasized again and again by every competent writer who has given attention to the subject. From the results of his questionnaires, Professor Kelley notes that most scientists agree that certain tugs facilitate forward motion; namely (1) talents, (2) training and (3) facilities, whereas the hold-backs that slow down scientific progess include individual stupidity, prejudice, preconceptions and social taboos. Finally, rapid advance may be encouraged by adapting training to encourage a scientific type of thinking; providing better facilities for the conduct of scientific work, and causing society itself to lift further its taboos upon what men shall think and do. Actually the taboos are being lifted now so rapidly that some are already questioning the wisdom of complete release from inhibitions that were a part of the religious and moral training of the past.

President Conant, summarizing his consideration of the tactics and strategy of science lists the ways in which new concepts evolve from experiments or observations and thus become fruitful of new experiments or observations. Such concepts may result from systematic experiments or observations, from a consideration of difficulties inherent in an old concept, from accidental discoveries which are followed up, from evolution through a series of successive approximations from older concepts, from elaboration of a limited working hypothesis, from the elaboration of an hypothesis or conjecture on a grand scale. Professor Conant adds also the definition of a concept and thus helps us to define more accurately the nature of research. A distinction must be made between a new concept and the "explanation of this concept." A scientific discovery must fit the times. A well established concept need not be discarded if it is highly satisfactory to those who use it. Finally, advances in the practical arts are not the same as advances in science. The amassing of data Conant emphasizes does not constitute advance in science. Yet how often such mere accumulations have been labelled research and included in annual reports to amaze readers and encourage philanthropists and the directors of government bureaus[14]

THE FUTURE OF SCIENCE IN THE UNITED STATES AND THE NATIONAL SCIENCE FOUNDATION

Chancellor Robert Hutchins speaking on the state of the university remarked that one of the great new problems about scientific research is its cost. "The good old days, when a chemist could get along with a couple of glass bottles and a Bunsen burner in a back room, are apparently gone forever. Now the size of the equipment, its high rate of obsolescence and the number of men required to operate it make research an enormously expensive undertaking." Industrial support has been most helpful, particularly since industries have learned to support basic as well as applied research. Hutchins notes also that the independence of an endowed university results largely from the fact that it has many sources of income. The university has welcomed government support of research, feeling that it does not endanger the independence of an endowed university unless such support is too large a proportion of the total expense of the institution. The proportion, he feels, is too large if the withdrawal of governmental support would endanger the essential activities of the university. "A university should be in a position to reject grants from the government when they invade the freedom of research impose onerous terms upon it or tend to force the university into fields that it does not want to enter." At this time, the report indicates approximately 13 per cent of the income of the University of Chicago is derived from grants from governmental agencies. The university now has 99 contracts covering 132 projects with 16 agencies. The governmental agencies also are committed to the support of basic research. Few institutions now are unwilling to entertain the idea of government support. President Truman in his message to the Congress on the State of the Nation January 4 said:

> The value of our natural resources is constantly being increased by the progress of science. Research is finding new ways of using such natural assets as minerals, sea water, and plant life. In the peaceful development of atomic energy, particularly, we stand on the threshold of new wonders. The first experimental machines for producing useful power from atomic energy are now under construction. We have made only the first beginnings in this field, but in the perspective of history they may loom larger than the first airplane, or even the first tools that started men on the road to civilization.
>
> To take full advantage of the increasing possibilities of nature, we must equip ourselves with increasing knowledge. Government has a responsibility to see that our country maintains its position in the advancement of science. As a step toward this end, the Congress should complete action on the measure to create a national science foundation.

Alan T. Waterman,[15] chief scientist, Office of Naval Research, in Washington, has indicated some of the reasons why scientists fear Federal support of research. The majority of scientists would consider such support justified "provided the values inherent in the traditional environment of research, such as continuity, initiative and freedom of communication and publication, can be obtained."

In a statement to the Senate committee which held hearings on a federal program to promote scientific research, October 22, 1945, I pointed out that the number and diversity of measures that have been proposed are in themselves evidence of the difficulty of finding a formula that will accomplish the desirable objectives of such legislation without introducing factors harmful both to research and to our system of government. The factors to be avoided include bureaucratic domination of research, inhibition of investigations carried on under private initiative and the spending of funds to support education in the guise of encouraging research. Support by the government should leave the policy, personnel, methods and scope of research to the colleges, universities and research institutes themselves. Institutional and personal liberty in research must be fully safeguarded. The responsibility for such safeguards should be entrusted to men of scientific achievement, knowledge and leadership rather than to professional government administrators.

Professor Cannon felt that it certainly seemed reasonable that government should support research generously with the expectation that valuable results would be obtained, that the citizenry would be enriched, and the public welfare promoted. Nevertheless he feared political influences: "Any agency set up to administer a fund assigned by the government for grants-in-aid should, of course, be scrupulously fair in its decisions, acting in complete disregard of partisan, social, or racial considerations." Yet he feared particularly that entrance of the government into the field would diminish if not eliminate the funds coming from industries and the foundations. In France everyone counts on the government to support research and little or nothing comes from private sources. "Indeed," says Professor Cannon, "the French felt as little inclined to contribute private money to improve conditions in the universities as we might feel if asked for money to improve conditions in our postoffices."

Perhaps the greatest menace to science and the control of science by the state would be the establishment of a government by scientific experts who had no statesmanship. Thus J. B. S. Haldane quotes Russell's prediction of a world governed by science:

> In the scientific state there will be no war or real poverty, and a minimum of disease. The working class will be educated to be docile, industrious, punctual, thoughtless, and contented. They will probably largely be sterilized, so as to allow them unlimited frivolous love affairs. The ruling class will continually provide them with new amusements, and devise new methods of propaganda to increase their reverence for their governors.
>
> These latter, selected by psychological tests in early childhood and specially treated to secure the maximum of ability, will be trained in intelligence, self-command and leadership. But they will combine these with a fanatical loyalty to their class and its ideals, and a contempt for other human values. Individual love will be regarded as antisocial, and likely to lead to complexes.

SUMMARY

"Research," said Torald Sollman, "is a bird that sings only when it is free." Discovery requires the broadest possible liberty to search in as many places as possible, by as many competent scientists as possible, in any manner and by any means that they themselves consider possible.

Most basic among all the basic factors favoring scientific research is freedom—freedom for an inspired individual to pursue his will-of-the-wisp wherever chance or fortune may lead him. The inspired individuals appear, as if by chance; then educators and leaders in science recognize them and start them up the road to glory. Some find they are far ahead of their times and struggle desperately onward against the obstacles of doubt and derision—but they do not despair. Others, like Einstein and Michelson, ripen time for their concepts even when the vast majority of mankind have not the slightest idea what they are talking about. Harvey Cushing summarized it in a sentence of an address to the Massachusetts Medical Society at its 150th reunion in 1931. His paper was called "From Tallow Dip to Television." He said: "Opportunity, personality, position, chance, in addition to vision and the prepared mind—all have a hand."

There is no formula, no combination of circumstances, no system of organization guaranteed to produce the results desired There are only investigators with characteristics somewhat common to their class, who appear rarely among thousands of neophytes in all the fields of science We must recognize them early, give them facilities and opportunities, encourage them if they thrive on praise and taunt them if they do better on harrassment and stimulation. Apparently, no matter what we do, they will themselves go forward, even against the current, even to starvation and if need be to death, if within their souls is the true spirit of research.

RÉSUMÉ

“La recherche” a dit Torald Sollmann, “est un oiseau qui ne chante que lorsqu'il est libre ” Les découvertes demandent des investigations aussi libres et aussi étendues que possible dans le plus grand nombre de champs variés par le plus de savants compétents possible, et par toutes les méthodes qu'ils considérent comme appropriées

Parmi tous les facteurs fondamentaux qui favorisent les recherches scientifiques, le plus important, est la liberté—la liberté dont jouit celui qu'inspire la science à poursuivre son rêve où que le hasard ou la fortune puisse le conduire Ils apparaissent, ces illuminés, ici et là, puis les éducateurs et les leaders de la science les reconnaissent et les conduisent vers les champs fertiles de la science et de la gloire. Quelques uns se trouvent en avance sur leur siècle et se débattent désésperément contre les obstacles offerts par le doute et la dérision—mais ils ne succombent pas D'autres, tels Einstein et Michelson mûrissent leur ère par leurs conceptions même, si l'immense majorité de leurs contemporains sont incapables de les comprendre Harvey Cushing l'a bien dit, dans son discours à la “Massachusetts Medical Society” lors de sa 150 réunion, en 1931. Son discours, intitulé, “de la chandelle de suie à la télévision” contient la phrase suivante:

> L'occasion, la personnalité, la position,
> la chance, en plus de la vision et de
> l'esprit aux aguets: tout s'en mêle.

Aucune formule, aucun concours de circonstances, aucun système d'organisation ne peut garantir d'obtenir les résultats désirés. Ce sont des chercheurs dont les traits principaux se retrouvent fréquemment dans leur classe, qui apparaissent de temps à autre parmi les milliers de néophytes dans toutes les branches de la science. Nous devons les reconnaitre de bonne heure, leur fournir les opportunités et les facilités dont ils ont besoin, les encourager, s'ils se nourrissent d'hommages, les harceler s 'ils ne créent que sous le stimulus du dédain. Mais quoi que nous fassions, ils iront d'eux-même en avant, même contre le tumulte du courant, même en souffrant de la faim, et même jusqu'à la mort, si dans leur âme brille la flamme de la recherche.

RESUMEN

“La investigación” dijo Torald Sollmann, “es pájaro que solamente canta en libertad”. El descubrimiento requiere la máxima libertad posible, para investigar en el mayor número de lugares posibles, por el máximo número de hombres de ciencia competentes que sea posible, y del modo y por los medios que ellos consideren posibles

El factor básico más importante de todos es la libertad para que un individuo inspirado siga la huella de sus inspiraciones, donde quiera que el azar y la suerte puedan llevarle Los seres inspirados aparecen como por azar, pero después los educadores y los abanderados de la ciencia los reconocen, y los encaminan hacia la ruta que asciende a la gloria Algunos de ellos están muy por delante de su época y luchan desesperadamente para ir adelante contra los obstáculos de la duda y el escarnio por no desesperar. Otros como Einstein y Michelson llegan a madurar sus conceptos, incluso cuando la mayoría de la Humanidad no tiene idea de las cosas de que allos están hablando. Harvey Cushing resumió este punto de vista en una frase de un discurso en la Sociedad Médica de Massachusetts en su 150 reunión celebrada en 1931, titulado “De la vela de sebo a la televisión”, en el que dijo:

> “La oportunidad, personalidad, posición y azar, además de la visión (intellectual) y la preparación mental . . . todos son factores participantes ”

No existe fórmula, combinación de circunstancias ni método de organización que esté garantizado para producir los resultados deseados Solamente existen que investigadores

con características en cierto modo comunes a su clase, que aparecen regularmente entre miles de neófitos en todos los campos científicos. Debemos reconocerlos precozmente, darles facilidades y oportunidades, alentarlos si son del tipo que madra con el elogio y fustigarles si es que trabajan mejor cuando se les somete al apremio o al estímulo. Al parecer, no importa lo que hagamos, esos hombres marchan adelante e incluso contra la corriente, llegando a sufrir depauperación y si fuera preciso hasta la muerte, si es que dentro de sus almas existe el verdadero espíritu de la investigación.

RIASSUNTO

"La ricerca" ha detto Torald Sollmann "e' un uccello che canta solamente quando e' libero." Le scoperte richiedono la piu' ampia liberta' di azione nel maggior numero di localita', dal maggior numero di scenziati, nella maniera e con i mezzi che essi ritengono piu' idonei.

La base fondamentale per ispirare, per favorire la ricerca scientifica e' la liberta': liberta' per ogni individuo che trova un'ispirazione di seguire il suo ideale, qualunque sia l'esito che lo attende. Individui dotati di un'ispirazione sorgono quasi per incanto: la loro ascesa alla gloria viene poi aiutata dai maestri e dagli educatori. Alcuni di questri iniziatori appaiono spostati nel tempo, nel senso che precorono gli eventi: essi debbono lottare contro dubbi e derisioni, ma non disperano mai. Altri, come Einstein e Michelson, maturano i loro concetti anche allorquando la grande maggioranza dell 'umanita' non ha la minima idea di cio' che scrivono o dicono.

Harvey Cushing, nel parlare alla Societa' Medica del Massachusetts durante la sua 150ª-riunione nel 1931, ha riassunto in una frase gli elementi che contribuiscono al successo: "Opportunita', personalita'posizione, combinazione, preparazione e previsione; tutti questi elementi recano il loro contributo."

Non esiste una formula, una combinazione di circostanze, un sistema di organizzazione, che assicurino i risultati desiderati. Esistono solo taluni ricercatori, aventi caratteristiche proprie alla loro classe, che si selezionano da migliaia di neofiti in tutti i campi della scienza. Dobbiamo riconoscerli in tempo: dare loro i mezzi e le opportunita'; incoraggiarli se vengono stimolati dalle lodi, criticarli se migliorano con un giudizio piu' severo. Qualsiasi cosa facciamo per loro, essi andranno avanti da se', anche contro corrente, anche verso la fame—o se necessario—verso la morte, se nella loro anima esiste il vero spirito della ricerca.

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In the fields of observation, chance favors only the prepared mind.—Pasteur

Dangers and Disappointments of Biliary Surgery

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THIS paper must of necessity be brief It is an epitome of some dangers and disappointments that dog the steps of surgeons who engage in operations on the biliary passages, and it has been aptly stated that this region is 'one which is approached with bated breath and departed from with a sigh of relief!"

Difficulties and Dangers—1 Hemorrhage Apart from unavoidable and perhaps tiresome bleeding from division of small veins during exposure of the ducts hemorrhage should not occur The cystic artery is the only dangerous vessel that concerns the surgeon and theoretically it should be possible to expose and ligate this artery without difficulty However, accidents occasionally occur The vessel may retract through the teeth of faulty forceps, or the ligature may slip, especially if catgut is used, therefore thread or silk, either of which has a much better frictional grip is preferable In the event of arterial hemorrhage, blind groping with hemostatic forceps is an instinctive reaction but one to be deplored since there is danger that a bile duct, especially the right hepatic duct, may be included The correct procedure is to control the bleeding by means of a swab on a holder and to insert the left forefinger through the foramen of Winslow, pressure with the thumb then compresses the hepatic artery Blood is then mopped away and gentle relaxation of pressure will reveal the exact site of the bleeding If necessary, this maneuver can be repeated until the actual vessel is clearly seen, when it may be seized and ligated As a last resort, if local conditions render ligation impossible, the hemostat must be left *in situ* and the wound closed around the instrument which is removed four days later

2 Injury to Ducts Even if one follows the golden rule that ducts must be clearly exposed, accidents occasionally occur, especially if the ducts deviate anatomically from what is considered normal In this connection it is interesting to record that Flint[1] studied the anatomic pictures of the biliary ducts in 200 cases, and in only 69 did they conform to the usual textbook description Should one of the hepatic ducts be divided, immediate end to end suture must be attempted, and the junction is supported by a T tube introduced *below* the suture line If the tube is inserted through the anastomosis the formation of a subsequent stricture is encouraged

Abnormal ducts cause trouble even to the most experienced surgeon, and two of these deserve special mention

(*a*) A cholecystohepatic duct occasionally passes from the liver into the back of the gallbladder (Fig 1) This should be recognized by an observant surgeon who is aware of the possibility Ligation is the ideal procedure, otherwise the duct is ruptured when the gallbladder is separated from its bed This can be recognized by drops of bile continually escaping at one point on the raw surface Firm application of the diathermy button usually seals off the duct If the condition is unrecognized, bile will be discharged and form a subphrenic collection that requires drainage, but after a few days or weeks the discharge ceases Neuhof and Bloomfield[2] described 2 cases in which the duct measured about 2 mm in diameter In 1 case it was unrecognized, and a fistula resulted which closed in forty five days, in the other the duct was recognized at operation and closed with a purse string suture

(*b*) A more serious condition confronts the surgeon when the right hepatic duct enters the gallbladder (Fig 2) After ligation of the cystic duct and artery this abnormal duct is in imminent danger when the gallbladder is separated from the liver If the duct is recognized before division the easiest procedure is to perform a cholecystoduodenostomy, otherwise the severed duct must be implanted into the left hepatic or the common bile duct

Disappointments—I do not propose to discuss the disappointments that follow inadequate or inefficient surgical management, such as damage to normal ducts, errors of diagnosis,

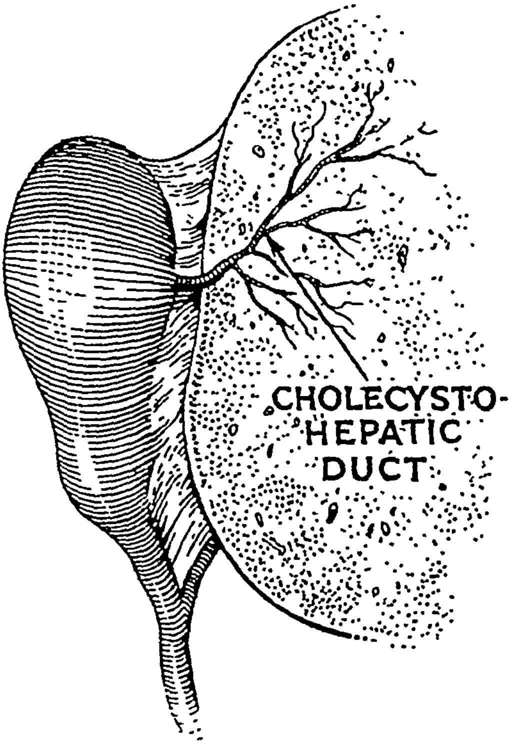

Fig 1.—Cholecystohepatic duct passing from liver into back of gallbladder

(e.g., in cases of coronary disease) or omission to remove the appendix I am limiting my remarks to some of the disappointments that occur even after recognized and accepted methods have been adopted

1. Overlooked Stone: After cholecystectomy for gallstones, about 1 per cent of patients present themselves with a further stone or stones in the extrahepatic ducts. Symptoms recur, and the question arises whether the stone was overlooked at the operation or subsequently developed in the duct The surgeon favors the latter theory! However, a cholangiogram taken during the operation is a valuable safeguard against overlooking a stone. A roentgen film of the biliary passages taken during operation is of the greatest value, as it may reveal an obstruction or an abnormality not discernible by sight or touch. Conversely, if in a doubtful case the ducts are shown to be normal, unnecessary exploration is obviated The technic is simple and the time consumed is negligible[2]

When the patient returns with a second stone, a further operation must be performed on a sufferer who has lost some of his previous enthusiasm.

2. Chronic Pancreatitis: Infection spreads from the biliary tract along the pancreatic ducts to the acini. Pancreatic secretion is diminished, and flatulent dyspepsia follows.[1] Unless this is remedied, the patient complains of symptoms like those from which he suffered prior to cholecystectomy, and he is naturally disappointed. The remedy lies in curtailing the intake of fats and prescribing some pancreatic preparation for three months or so.

After a variable period the symptoms alleviate or disappear, either because the pancreatic infection subsides or because the intestinal glands adapt themselves, as presumably occurs after removal of the head of the pancreas for carcinoma.

3. Sphincteric Spasm: It has been shown experimentally that the sphincter of Oddi relaxes after removal of the gallbladder. However, if infection of the biliary passages persists after operation, spasm of the sphincter may be maintained. This type of biliary dyskinesia is characterized by recurrent attacks of pain that simulate biliary colic.[5] Morphia and

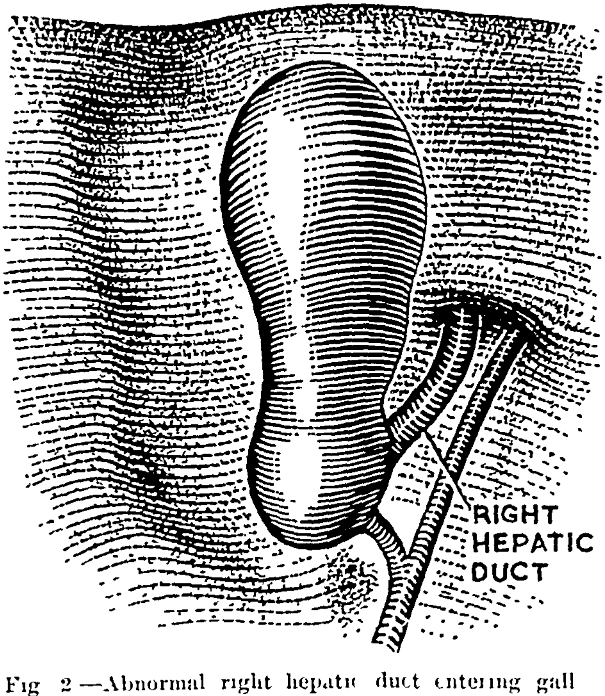

Fig 2—Abnormal right hepatic duct entering gall bladder.

its derivatives are contraindicated, as they cause further spasm Antispasmodics, such as amyl nitrate for an emergency, or pethidine (an atropine derivative) for more prolonged use, relieve the symptoms Cholagogues, such as saline aperients and dehydrocholin, diminish the viscosity of the bile and are valuable adjuvants If symptoms persist, duodenotomy is sometimes advisable This permits division of the sphincter, which may be not only spastic but fibrotic

A further cause of reflex sphincteric spasm is the formation of a calculus in the stump of the cystic duct, which should have been ligated ¼ inch (0 6 cm) from the common duct Symptoms develop some years after cholecystectomy, and if the patient is incapacitated exploration is necessary , this possibility should be borne in mind Peterson[7] collected 42 cases, in some of which the cystic stump was as large as a normal gallbladder The stump is usually buried in adhesions, and may be discovered only by opening the common duct and passing a probe into the cystic duct

4 Premalignant Lesions of the Ampulla In a recent paper, Cattell and Pyrtek[3] reported cases in which symptoms persisted after cholecystectomy and were found at subsequent operation to be due to an adenoma, either simple or undergoing malignant change, of the ampulla This emphasizes the desirability of cholangiographic study during operation, as a filling defect or obstruction of the lower end of the common duct would encourage the surgeon to explore further, either by mobilizing the duodenum or by performing a duodenotomy

It is interesting to note that innocent neoplasms in this area are occasionally an incidental discovery during routine autopsies

SUMMARY

No urologist would deem his responsibility discharged if he merely removed a stone from a bladder Causes, complications and subsequent effects all require consideration The biliary apparatus and its handmaiden, the pancreas are an even more perplexing, and a much less understood, combination of complicated structures

A check up on the end results of cholecystectomy shows that about 15 per cent of the patients are disappointed (Sanders,[8] Saint[9]) This is a high figure and it is only by careful consideration of operative technic and thoughtful after treatment that this figure can be reduced to negligible proportions, as it should be

RÉSUMÉ

Nul urologiste consciencieux ne considère son devoir rempli lorsqu'il a simplement extrait un calcul de la vessie Sa cause, les complications possibles et autres données exigent qu'il y concentre son intérêt Le système biliaire et son frère cadet, le pancreas, sont encore plus complexes et bien moins compris dans leur ensemble de structure compliquée

L'étude des résultats finaux de cholecystectomie démontre qu'environ 15% des malades en furent désappointés (Sanders, Saint) C'est là un chiffre élevé et ce n'est qu'après une évaluation approfondie des techniques chirurgicales et d'une thérapeutique post opératoire bien pesee que ce taux peut être reduit a de plus justes et infimes, proportions

RESUMEN

Ningun urologo puede considerar que ha cumplido con su responsabilidad simplemente extirpando un calculo de la vejiga Las causas, complicaciones y efectos subsiguientes requieren tambien su atención El aparato biliar y su compañero el pancreas son una combinación de estructuras complejas mas complicadas y menos entendidas

Una revision de los resultados finales de la colecistectomía demuestra que el 15 por ciento de los pacientes no quedan curados (Sanders,[8] Saint[9]) Esta es una cifra elevada y solo mediante la consideración minuciosa de la técnica operatoria y un tratamiento postoperatorio bien meditado podría reducirse esta cifra a las proporciones insignificantes en que debiera encontrarse

RIASSUNTO

L'apparato biliare ed il pancreas formano una combinazione fisiopatologica che non e' ancora bene compresa e che offre adito a molte incognite Un controllo dei risultati a distanza della colecistectomia dimostra che nel 15% *dei casi i pazienti non sono soddisfatti* Questa percentuale e' troppo elevata Potrebbe e dov

rebe essere ridotta (come e' avvenuto pez i calcoli vescicali) se la tecnica operativa fosse sempre perfetta e se le cure pre- e postoperative venissero scrupolosamente seguite.

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A Simpler and Safer Proctosigmoidectomy

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THE proctosigmoidectomy of Mr. W. Ernest Miles of London, published in 1914,[1] marked an epochal advance in the treatment of malignant disease of the terminal portion of the colon. It remains a very popular operation, although evidence has accumulated during recent years that it has unnecessary and objectionable features

Unnecessary for most patients with cancer of the bowel is the removal of the anus and surrounding perineum, areas which in 97 per cent of cases are and remain free from malignant invasion.[2] This perineal phase of the operation is also objectionable as adding to the magnitude of the operation and greatly delaying recovery.

Objectionable also is the retention of mesentery and peritoneum to an "inch" of its bowel attachment in order to peritonealize the denuded areas and to form a pelvic diaphragm, for this makes the Miles operation less radical and invites recurrence. Such recurrences in peritoneum and fascia propria I have found rather frequently in attempting to transplant objectionable colostomies from the Miles operation to the perineum. It seems probable that the rather low five-year survival rates—between 42 and 55 per cent—reported by well known surgeons, such as Gabriel, Dukes, Cattell, Lahey and T. Jones, may be due to this cause. Otherwise it seems difficult to explain why, after the "pull-through" type of operation,[3] in which the mesentery and pelvic peritoneum are widely excised but the anus retained, the five-year survival rate has been from 65.5 to 77.3 per cent.

Since methods of computing statistics vary, an explanation is desirable. In my personal series, with an operability of 97 per cent, 150 patients survived for five or more years the pull-through type of operation for carcinoma of rectum or sigmoid. Of these, 22 with metastatic carcinoma of the liver found at operation and 13 who later died of nonmalignant causes have been deleted, leaving 115 patients, including all (18) who could not be traced after operation, as well as those (55) who had malignant extension to lymph nodes, small intestine, uterus, prostate or vagina. Of the 115 patients 75, or 65.5 per cent, have lived five or more years since the operation. If untraced patients are omitted the percentage is 77.3.

I know of no death that could be attributed to the wide denudation of pelvic peritoneum, and in a few instances reoperation has demonstrated surprising reperitonealization with relatively few adhesions. Experimentally, catgut and other irritating suture materials lead to postoperative adhesions that may be fully as dense as those following deperitonealization. In other words, the surgeon who peritonealizes with catgut sutures may be confronted with secondary adhesions as dense as would have occurred had the area been denuded of peritoneum.

With the evidence that cancer of the bowel situated 6 cm. or more above the perineum has little tendency to spread downward, and that a wide removal of the peritoneum and fascia propria about and above the cancer is necessary, I have used, in selected cases, a simplified abdominal proctosigmoidectomy that is well adapted for surgeons who do not object to leaving the patient with a colostomy. Through a midline incision extending upward from the pubis or a left oblique incision along the lateral border of the left rectus muscle, the abdomen is opened and explored for metastases or other complications. The left peritoneal leaflet of the rectum and sigmoid is divided wide of the bowel. The left spermatic or ovarian veins are separated from the peritoneum and retracted to the left, as is also the slightly deeper left ureter. The hand is then slid under the rectum and sigmoid, which are

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From the Surgical Department of Temple University Hospital, Philadelphia.
Submitted for publication Feb. 13, 1950

widely separated from the bifurcation of the aorta, the iliac vessels, the lower vertebrae and the sacrum to the base of the coccyx. As the right peritoneal leaflet is elevated by the underlying hand, the right ureter is recognized running along the brim of the true pelvis. Medial to and parallel with the right ureter, the thin, semitransparent peritoneum is divided freely. The hand is withdrawn from under the sigmoid loop and the medial edge of the right-sided mesenteric incision is elevated on the finger, which catches also the underlying thick cord of superior hemorrhoidal vessels and lymphatics. The upper portion of this cord is divided between clamps below the first sigmoid artery or at a point well above any enlarged lymphatic nodes, and is transfixed and doubly ligated. Below and parallel with the first sigmoid artery, the mesentery is divided from its peritoneal margin to the bowel, with ligation of any open blood vessels. If necessary to obtain sufficient free bowel to reach through the anterior abdominal wall, the lower part of the descending colon may be liberated after dividing its left lateral peritoneal reflection parallel with and 1 or 2 cm. from the bowel. The lateral peritoneal incisions are extended downward wide of the bowel and united in front of the base of the bladder or vagina, with liberation of the rectum and division of the medial and inferior hemorrhoidal vessels at the sides of the pelvis. Usually these vessels are small and may not require ligation. Care should be taken to avoid the ureters by their early liberation and lateral displacement. Anteriorly, with the aid of deep retractors, the bowel is separated from the bladder and seminal vesicles or from the vagina. With the rectum elevated, two right-angled clamps are applied across it at least 4 cm. below the cancer, and the bowel between the clamps divided by cautery; or by a knife followed by application of tincture of iodine to the cut surfaces. The clamped upper segment is withdrawn and wrapped in a towel. The next important step is provision for adequate drainage.

Drainage.—Drainage is an important part of operations in which the rectum and sigmoid are resected. There is considerable exudation of blood and serum from denuded areas and irritated serosal surfaces. With bacterial contamination or leakage along lines of anastomosis, an easy convalescence or a fatality may hinge upon the drainage. Anterior drains, especially of adhesion-provoking material such as gauze or rubber, lying between intestinal coils not infrequently lead to intestinal obstruction. Drains with adequate vents lying entirely behind or below the mass of intestinal coils provide good drainage with the fewest complications. From a considerable experience with bulky gauze drains through the vaginal vault, after operations for uterine and ovarian tumors, pelvic infections and ectopic pregnancy, as well as for rectal resections with associated removal of portions of the female pelvic organs, I recall no serious complications resulting from use of these lower drains.

Would the anal canal serve as well as the vagina for drainage after rectal resection? From an emergency trial in a patient from whose low rectal anastomosis a heavy fecal leakage had developed, it was decided that the anal canal serves even better for drainage than the vagina. In this case the bowel was clamped just above and just below the anastomosis, which was pulled apart. The edge of the lower segment of rectum was steadied by one or two hemostatic forceps, the clamp removed and the end of a folded iodoform gauze tape 5 cm. wide and 1 m. long was pushed down through the terminal segment of bowel and anus. The anal canal was not cleansed from above, but a sufficient length of tape was introduced to push out any fecal material as well as to wipe off the mucous surfaces. The tape was made of a piece of gauze 1 m. long and 20 cm. wide, folded with the selvedge edges inside. The residual tape was folded smoothly upward and downward so as to cover completely the open lower end of the rectum and also all contaminated or denuded surfaces about the pelvic floor. It was so folded that the underlying layers would be the first withdrawn from the anus without disturbing the anterior folds, which in the early postoperative period may be adherent to overlying bowel or omentum. Gauze pads, used to keep the small bowel from the upper part of the pelvis during the operation, were next removed and the omentum pulled down anteriorly over the intestinal coils. The abdominal incision was then closed about the protruding sigmoid, which formed the colostomy

In less urgent cases an additional incision may be made through the abdominal wall at a point selected for the colostomy opening Through this opening a clamp is passed from the outside to grasp the liberated sigmoid well above any area of malignancy Just distal to this a second clamp is applied, and with surrounding protecting wet pads the bowel is divided between the clamps by a cautery The malignant segment is discarded while the proximal end iodized and with a protective cover, is pulled through the colostomy opening in the anterior abdominal wall by its attached clamp The rest of the abdominal incision is then closed preferably with layer sutures of interrupted or continuous single or multistrand stainless steel wire

The protruding bowel should be divided 5 cm or more above the abdominal wall and a tube tied in A right angled glass tube 1 to 2 5 cm in diameter, with hollow bulbous ends is preferred A ligature about the tube and bowel arrests bleeding, while a thin rubber Penrose drain slipped over the other end of the tube and tied, serves to conduct any intestinal drainage into a rubber bag or glove outside the dressings The protruding sigmoid should stand up at right angles to the abdominal wall and should be protected and supported by a cuff of soft gauze Necrotic openings in the bowel close to the skin are often caused by the pressure of carelessly arranged dressings adhesive plaster or bags and may give the patient much discomfort from leakage and erosion of the skin

No other drainage is needed and the gauze through the anus has drained satisfactorily with little or no irritation or tenesmus Probably others have used peritoneal drains through the anal sphincters before, but I recall no published case I have used the method not only when after low end to end anastomosis free leakage of intestinal contents into the abdomen has occurred but also when the pull through type of proctosigmoidectomy has been followed by ascending necrosis of the bowel and leakage into the abdomen of intestinal gas or feces Likewise it has made possible a rapid termination of a low resection of bowel when hemorrhage, leakage abscess or other serious contamination or complication has occurred For example, a severe and inaccessible hemorrhage, as from the obturator vein has been arrested by a gauze pack which later it is desired to remove with the least disturbance of the wound or the abdominal contents, these conditions are met by the facility with which the gauze may be withdrawn through the anus

The operation can be used with increased safety and shorter convalescence instead of the conventional abdominoperineal or perineoabdominal resections when the lower 6 cm of rectum is free from disease and it carries the possibility of a later anal anastomosis and abolition of the colostomy The uniform rapid and comfortable convalescence after this operation has convinced me that it is also a safer method for removing a septic or perforated section of rectum, e g , in cases of malignant disease or diverticulitis It may be selected as the safest type of operation for a gunshot or other wound of the rectum or when there is a serious pelvic infection necessitating colostomy and free pelvic drainage Likewise if there has been an associated injury with insecure or questionable closure of the ureter, bladder or small intestine, this operation provides excellent dependent drainage while stimulating the formation of limiting adhesions

It is simpler and safer than the Hartmann operation, in which there is an anterior resection of the rectum and sigmoid the distal end of the rectum being inverted and closed by suture while the proximal segment is brought out through the anterior abdominal wall for a colostomy The inversion of the edges of bowel by suture with dependable water and gas tight closure of the distal end of the bowel particularly if in the depths of the pelvis may be the very difficult part of the Hartmann operation and I now know it to be both unnecessary and undesirable For the surgeon who in any case will leave the patient with an abdominal colostomy, I feel sure the method is of advantage provided the malignant growth has not involved pelvic structures below the level for adequate extirpation through an abdominal incision

The procedure makes possible the rapid termination of a lower bowel resection as in the case of hemorrhage, fecal soiling or shock. The operator of limited experience in intestinal surgery should be able to reduce his mortality rate by this simplified procedure, and if the patient is dissatisfied with the colostomy, it may perhaps, in more experienced hands, later be eliminated by an end-to-end anastomosis or by a pull-through type of operation in which even a part of the transverse colon may be pulled through the anal ring. Likewise, surgeons who have preferred the Miles operation may find this procedure of advantage for growths that are sufficiently high in the rectum. However, many patients, to avoid colostomy, will accept the greater risk of resection with end-to-end anastomosis or of the pull-through operation.

In postoperative treatment, care should be taken not to disturb the anal gauze drain during the first four days after operation, except gently to straighten out any kinks or folds where it passes through the anal canal. The gauze should not be cut off close to the perineum, lest it may retract and be difficult to find. To reduce any tendency to ascending peritoneal contamination, which seems to be slight, I have used gauze pads, the one next to the perineum being coated with a layer of 2 per cent yellow oxide of mercury ointment.

The gauze drain is partly withdrawn on the fourth or fifth postoperative day, provided it comes away without resistance. Additional loose segments of gauze are then removed daily until all have been removed—usually about the seventh day. Withdrawal of the gauze should not be painful, and assistants should be warned against early removal of the drain. As a rule, in uncomplicated cases the patient is in condition to leave the hospital between the eighth and the tenth postoperative day.

SUMMARY

A simplified method of radical proctosigmoidectomy with colostomy for rectal carcinoma, diverticulitis and other inflammatory lesions or traumatic injuries of the lower bowel, with anal drainage, is described.

The unusual but extremely important part of the operation is the use of the anus and the terminal segment of the bowel for comfortable and effective dependent gauze drainage of the abdominal cavity.

As the operation retains the anus and sphincters, the colostomy may be eliminated later by an end-to-end or a pull-through type of anastomosis.

RÉSUMÉ

L'auteur décrit une méthode simplifiée de proctosigmoïdectomie radicale avec colostomie pour les cas de carcinomes rectaux, les diverticulites et autres lésions inflammatoires ou traumatiques de la partie inférieure du gros intestin. Cette méthode emploie le drainage anal.

La partie originale, mais extrêmement importante de cette opération consiste à utiliser l'anus et la partie terminale du gros intestin pour le drainage à la gaze dans la partie déclive de l'abdomen, qui est à la fois confortable et efficiente.

Comme cette opération conserve l'anus et les sphincters, la colostomie peut être supprimée plus tard par l'anastomose bout-à-bout ou l'anastomose à traction.

RESUMEN

Se describe un método simplificado de proctosigmoidectomía con colostomía para tratar un carcinoma rectal, diverticulitis y otras lesiones inflamatorias o lesiones traumáticas del colon con drenaje anal.

La parte poco frecuente pero extremadamente importante de la intervención es el empleo del ano y del segmento terminal del intestino para un drenaje cómodo y eficaz de la cavidad abdominal.

Como la operación conserva el ano y los esfínteres puede eliminarse después la colostomía por un tipo de anastomosis término-terminal o de anastomosis cruzada.

RIASSUNTO

Illustra un metodo semplificato di proctosigmoidectomia radicale con colostomia per cancro rettale, diverticolite ed altre lesioni infiammatorie o traumatiche del colon e del sigma. La parte piu' insolita ma piu' importante dell 'operazione consiste nell'uso dell'ano e della porzione terminale dell'intestino quale drenaggio comodo, ma nello stesso tempo sicuro della cavita' addominale.

Dato che l'operazione conserva l'ano e gli sfinteri, la colostomia puo' essere eliminata in

seguito mediante un'anastomosi termino terminale

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Language in Levitation

The apothecary's *scruple* was originally the *scrupulus*, a pebble of insignificant weight and size Your laboratory *funnel* has its name from the Latin *fundere*, to pour, and the *refund* you may get on your income tax is literally a *pouring back* The *razor* you use every morning is twin brother to the *abrasive* you described in that last surgical article, both stem from the verb *radere*, to *scratch out*, to *erase* Your instrument case was once known as a *tweeze*, hence *tweezers*, one of the instruments therein contained The parent word is the French *etui*, a small case

Influenza, an Italian form, is a memento of the ancient superstition that ascribed epidemic disease to the *influence* of the stars *Cancer* and *chancellor* have a common origin No patient is *decrepit* until he *creaks* with age

The salary you pay your secretary is her *salt*, and we hope she does not spend it all on *sausage* (which, oddly enough, is its cousin once removed) but prudently salts it away If her youthful *caprices* annoy you, you may without loss of dignity refer to her as a troublesome kid for to be capricious is to caper like a goat Nevertheless, if you speak to her with *sarcasm*, she may justly call you a *sarcophagus*, which was a flesh devourer before it became a coffin (hence "biting sarcasm" which is actually a redundancy)

Finally, if these linguistic vagaries make you *dismal*, it must be truly one of your bad days (*dies mali*) Muse bitterly on it if you will, but it is only fair to tell you that when you *muse* you employ your *muzzle*, as a dog does, to nose out discoveries

Periarterial Sympathectomy to Improve Vascularization of Lower Extremity

Report of a Case

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IN CASES of arterial thrombosis and obliteration Leriche suggested and performed resection of these parts, achieving correction of the vasoconstriction produced by the arterial changes.

In a report to the London congress (1947) he discussed the clinical and experimental observations and summarized: "Arteriectomy limits the reflectory mechanism of vasoconstriction to the local collateral circulation, where it produces active dilation. This observation proves that there is in the arterial wall a reflectory mechanism of vasoconstriction of collaterals, i.e., of reflectory arterioarterial and also of arteriovenous elements."

Leriche also reported 2 convincing cases. In the first, a 32-year-old patient complained of intensive abdominal pain followed by sudden signs of circulatory disturbances of the right lower extremity (tingling, edema, cyanosis and ulcers of the fourth digit). At operation the appendix was seen to be fixed to the iliac artery. After its removal the symptoms disappeared. In the second case intermittent limping, cyanosis and cooling of the extremity occurred after a bullet wound in the gluteal region. At operation a neuroma of the interrupted saphenus nerve adherent to the femoral artery was observed. After its removal normal conditions reappeared. Both the results of resection of thrombosed arteries and the results of removal of the cause of irritation in the arterial wall justify the concept of Leriche.

An interesting contribution to this concept is afforded by my experience in a certain case. There was an unexpected course during periarterial sympathectomy of the right femoral artery, which was performed because of symptoms of endarteritis due to frozen lower extremities.

The patient was a 35-year-old soldier whose legs were "frozen" after long standing in snow at the end of January 1945. He was treated for a short period only and returned to his military duties. Shortly afterward he began to complain of considerable and sometimes unbearable pain in the digits of both extremities, especially of the left second toe. He was admitted to the clinic on July 5, 1945.

The patient was of medium height, muscular and in good health. The temperature was 36.3 C., the pulse rate 75, the blood pressure 150 systolic and 110 diastolic. The digits of both lower extremities were cool and cyanotic and their skin was scaly. The pulse was impalpable in both dorsal arteries. Roentgen examination showed that the soft parts of the terminal phalanx of the left second digit were enlarged. The bones showed no pathologic change. Oscillations were noted as follows:

	Right leg	Left leg
Below the knee (maximum)	180/4½-160/4½	180-160/4
At the ankle	130/3	140/3

The following plan was suggested: (1) infiltration of the arteries with 1 per cent novocain; (2) infiltration of the lumbar sympathetics; and (3) periarterial sympathectomy. The first two treatments were without success; therefore periarterial sympathectomy of the left femoral artery was performed on July 10. The condition improved. On August 4 the same operation was performed on the right side (Prof. Jirásek). The artery was of normal size and embedded in tough adhesions, from which it was easily freed. The procedure was then carried through. During the final maneuvers the artery started to bleed slightly from the point where it was fixed with a forceps. If one tries to compress this point with an artery forceps, the small opening increases to a length of 1 cm. The arterial wall is apparently affected, as it ruptures with each compression. No further compression or suturing, therefore, can be contemplated. Because of bleeding of the peripheral end, the decision to perform an emergency ligature of the femoral artery with resection of the bruised tissue (about 3 cm.) is made easier. The extremity, for half an hour, was cooler; later the condition improved. The

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From the Surgical Clinic of the Charles University, Prague.

pulse reappeared at the inner side of the ankle Three hours after operation, infiltration of the right sympathetic was performed and this was continued during the whole week Two later examinations of the oscillations have shown that these are almost absent However, during walking there are no symptoms referable to the extremities and no pain The patient is completely satisfied with the result achieved The pain and the feeling of coolness have disappeared

It is difficult to explain this case completely The result shows that resection of the patent artery had a good influence on the pain and the feeling of coolness in the legs although vascularization of the extremity should have been smaller quantitatively considering the interruption of the main blood supply It is necessary to quote Leriche who basing his opinion on the experiments of Luigi Porta (1846) states in 1947 ' Isolated arterial obliteration i e without added vasomotor symptoms is always well tolerated if the collateral branches of the obliterated artery are patent and if the arterial pressure is sufficient ' In the present case the arterial pressure was sufficient but probably the collateral circulation was insufficiently functioning The adhesions observed at operation suggested irritation of the periarterial nervous pathways The previously mentioned condition put forward by Leriche was therefore not fulfilled Freeing and interruption of the periarterial femoral vasomotor pathways which were still irritated by the clearly demonstrated periarterial adhesions affected favorably the collateral circulation which was probably constricted because of this irritation I have made similar observations repeatedly in other cases The improvement is not indicated by the different oscillographic readings taken before and twice after the operation On the basis of Porta's experiments we know that in cases of interruption of the main artery circulation is maintained by collateral branches Although in the present case this circulation was apparently sufficient for peripheral nutrition its rhythm was not marked and its systolic impact disappeared in the collateral pathways An effect of the operation due to suggestibility of the patient can be excluded The patient was not informed of the course of the operation

In discussing these observations I am aware of the fact that no microscopic data on the injured and ligated femoral artery are available I am also aware of the possibility of congenital abnormalities of branching of the arteries which might be shown by arteriographic study and which may have been significant However there is no doubt that the blood circulation excluded from the femoral artery had to be replaced by collateral circulation and that the latter vascularized the digits better than the previous one Vascularization from the newly opened collateral pool was therefore more effective than that from the main artery with concomitant constriction of the collateral arteries If anything new is to be proved from these observations it is this With a patent main artery the irritated periarterial pathways can have a significant influence on the vascular bed below the point of irritation After this irritation has been excluded the other capillary pool and its circulation can be increased to such a degree that it functions better than the former anatomically normal one This can occur even in a case in which the main arterial blood supply is excluded

SUMMARY

In a patient with marked pain in the toes due to frozen legs a periarterial sympathectomy of the right femoral artery was performed Tough adhesions were present After finishing the procedure in attempting to compress a very small opening of the femoral artery a large opening in the arterial wall developed Because of friability of the arterial tissue it was impossible to suture the artery This emergency situation necessitated resection of the artery (about 3 cm) Half an hour later the condition of the extremity improved After repeated infiltrations of the lumbar sympathetic nerves no changes were observed The patient was completely without symptoms (pain feeling of coolness)

The following explanation is suggested Resection apparently excluded the factors leading to vasoconstriction and causing the symptoms in the digits It is not certain whether these influences were mediated in the arterial femoral wall as no microscopic data were available Influence from the arterial sheaths on vascularization below the point of action was [illegible]t After exclusion of this influ

ence the peripheral circulation was functionally more efficient than with normal arterial supply from the femoral artery, in spite of ligation of the artery.

RÉSUMÉ

Un malade, souffrant de douleurs d'orteils aigües après avoir eu les jambes gelées, subit une sympathectomie périartérielle de l'artère fémorale droite. De fortes adhèrences furent découvertes. Après avoir terminé la sympathectomie et pendant que l'on essayait de comprimer un petit trou de l'artère fémorale, une grosse brèche se produisit dans la paroi vasculaire. Le tissu artériel était tellement friable qu'il fut impossible d' y remédier par la suture. Il ne resta donc plus qu'à reséquer d'urgence environ 3 cm. d'artère. Une demi heure plus tard, l'état du membre était amélioré. L'infiltration répétée des nerfs lombaires sympathiques ne décela aucun changement. Le malade demeura asymptomatique (absence de douleurs et de sensation de froid).

L'auteur présente l'explication suivante: la résection apparemment élimina les facteurs qui causaient la vasoconstriction et les douleurs d'orteils. Comme les données microscopiques nous manquent, on ne peut affirmer que cette action prit place dans la paroi vasculaire fémorale. L'influence des gaînes artérielles sur la vascularisation au-dessous du niveau opératoire est importante. Cette action étant annulée, la circulation périphérique fonctionna de facon plus efficiente, en dépit de la ligature de l'artère, qu'avec l'apport sanguin normal de l'artère fémorale.

RIASSUNTO

Ha eseguito una simpatectomia periarteriosa dell 'arteria femorale destra in un paziente con forti dolori da congelamento delle dita dei piedi. Alla fine della simpatectomia, nel comprimere un piccolo foro dell 'arteria femorale, si e' determinata una larga apertura delle pareti arteriose. Data la fragilita' delle pareti stesse el 'impossibilita' di una sutura, si e 'imposta una resezione (di circa 3 cm.) dell'arteria. Le condizioni dell 'arto migliorarono mezz'ora dopo l'operazione. Ripetute infiltrazioni del simpatico lombare non modificarono le condizioni locali: assenza di dolori, di senso di freddo.

L'A. ritiene che la resezione dell'arteria ha eliminato gli stimoli che determina ono la vasocostrizione ed i disturbi di circolo delle dita dei piedi. Manca pero 'la certezza che questi stimoli si trasmettevano attraverso le pareti dell'arteria femorale, data la mancanza di controlli microscopici. Rimane il fatto che nonostante la legatura dell'arteria, la funzione vascolare periferica e' miglio rata di fronte a quella che era con un normale afflusso di sangue dall'arteria femorale.

RESUMEN

Se practicó una simpatéctomía periarterial en la arteria femoral derecha en un paciente con intenso dolor en los dedos del pie debido a una heladura de las piernas. Se observó la existencia de fuertes adherencias. Una vez terminada la operación y al intentar comprimir una pequeña abertura existente en la arteria femoral se presentó otra de gran tamaño en la pared arterial. Por la friabilidad del tejido arterial fué imposible suturar la arteria, requiriendo este problema de urgencia la resección arterial (unos 3 cm.). Media hora más tarde mejoró el estado de la extremidad. Después de practicar infiltraciones repetidas de los nervios simpáticos lumbares no se observaron otras alteraciones, continuando el paciente sin los síntomas de dolor y sensación de frialdad.

El autor propone la siguiente explicación: La resección excluyó, al parecer, los factores que determinaban la vasoconstricción y causaban los síntomas existentes en los dedos de los pies. No ha podido determinarse con seguridad si estas influencias estaban actuando sobre la pared de la arteria femoral, por carencia de datos microscópicos. Fue de importancia la influencia de las vainas arteriales sobre la vascularización por debajo del punto de acción. Después de la exclusión de estas influencias, la circulación periférica continuó funcionando de un modo más eficiente que con la irrigación arterial normal de la arterial femoral, a pesar de haberse practicado la ligadura de la arteria.

Parotid Gland Tumors and Their Surgical Management

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CLARIFICATION of the exact surgical anatomy and pathology of the parotid gland seems to have lagged behind professional knowledge of other organs accessible to surgical treatment As a result of incorrect or misleading information, the treatment of tumors of the parotid gland has in many instances been inadequate Neoplasms of this gland may remain completely curable for a decade or more Yet, because of misconceptions concerning their malignant nature and proper treatment, many are allowed to pass into gross and incurable malignancy

Interest in the surgical treatment of tumors of the parotid gland has been given a great stimulus by the pioneer work of Hamilton Bailey[1] He has made surgeons cognizant of the deficiencies in their knowledge of the anatomic, pathologic and clinical aspects of the parotid gland

It is our purpose here to dispel some of the common misconceptions concerning parotid tumors, to review some critical points of the surgical anatomy and pathology of the organ and to describe an adequate surgical procedure for removal of tumors of the gland

ANATOMIC CONSIDERATIONS

The most important addition to our knowledge of the surgical anatomy of the parotid gland was observed clinically by Hamilton Bailey and demonstrated in the laboratory by McCormack, Cauldwell and Anson[2] They showed that the gland is consistently bilobular, that the superficial, spreading portion of the gland is connected to the smaller, deep portion by an isthmus They demonstrated further that the facial nerve lies *between* the superficial and the deep portions of the gland, and that the isthmus is embraced by the temporofacial and cervicofacial divisions of the nerve This was the source of the expression that refers to the facial nerve as "the meat in a parotid sandwich" Another important point is the presence of frequent anastomoses between the two main divisions of the seventh nerve distal to the isthmus The clinical importance of these observations will be noted later

The parotid gland develops during the eighth week of fetal life from the oral ectoblast along the lateral groove separating the upper and lower jaws Its origin differs from that of the submaxillary and sublingual glands, which develop from a ridgelike structure in the buccal epithelium occupying the furrow in the angle between the base of the tongue and the floor of the mouth

The fully developed gland lies behind the upper part of the ramus of the mandible, which it overlaps medially and laterally A forward prolongation over the masseter muscle superior to Stenson's duct is sometimes designated as the accessory parotid The enveloping parotid sheath is continuous with the fascia of the neck as it passes upward from the sternomastoid muscle to the zygomatic arch The space occupied by the parotid is bounded in front by the ramus of the mandible The posterior margin is composed of the external auditory meatus, the tympanic plate, the base of the styloid process, and the front of the atlas These walls meet above at the petrotympanic fissure The posterior wall is prolonged laterally by the posterior belly of the digastric, the stylohyoid and the sternomastoid muscles The lower part of the styloid process, the styloglossus and stylopharyngeus muscles, and the stylomandibular ligament bound the posterior portion of the gland on its medial aspect There is no wall to the space occupied by the gland anterior to the styloid process, so the parotid rests on the fat and areolar tissue on the wall of the pharynx

The superficial portion of the gland overlying th [illegible] r muscle ha [illegible] he least limitation [illegible] so it ma [illegible] ward

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From the Cook County Hospital the Cook County Graduate School of Medicine and the Wesley Memorial Hospital Chicago

The authors are pleased to acknowledge the use of one illustration and a valuable personal communication from Mr Hamilton Bailey the zygoma, anteriorly over the edge of the masseter muscle and inferiorly until it is in contact with the submaxillary gland.

Stenson's duct emerges from the anterior aspect of the gland above its middle and courses over the masseter and through the buccinator muscles to enter the oral cavity. It lies in approximately the midde third of a line between the lower margin of the concha of the ear and the midpoint of the upper lip.

PATHOLOGIC OBSERVATIONS

Tumors of the salivary gland constitute 1 to 2 per cent of all tumors. Tumors of the parotid gland account for about 80 per cent of salivary gland tumors.

Since Virchow described mixed tumors of the parotid in 1863, extensive study of tumors of the salivary gland has been carried out by Ewing, Boyd, McFarland, and others In spite of the number of neoplasms examined, there is persistent disagreement concerning histogenesis, classification, and cytologic identification of individual tumors.

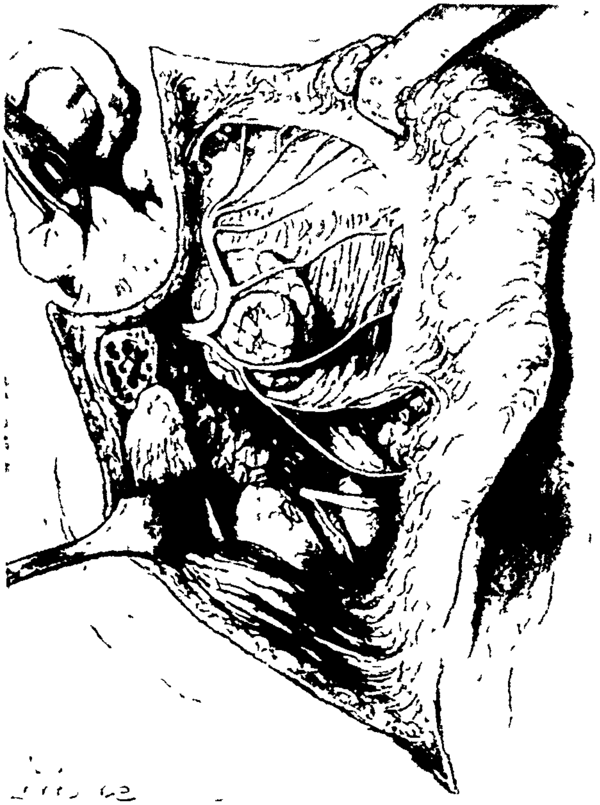

Fig 1—Hamilton Bailey incision Superficial lobe of the parotid gland removed; mastoid process resected to expose main trunk of seventh nerve. Cervicofacial and temporofacial divisions of seventh nerve encircle isthmus (Courtesy of Hamilton Bailey)

We prefer the following simple classification of parotid tumors:

1. *Cyst.*—Simple cyst is rare. It may develop as a result of atresia, obstruction, or congenital defects in the ducts The unsubstantiated diagnosis of "cyst" is a dangerous one, as malignant tumors may present cystic degeneration when first seen.

2. *Adenoma.*—A tumor occurring but rarely in the parotid, the adenoma is encapsulated, grows slowly, and mimics the parent gland in microscopic appearance. The safe time to make the diagnosis of adenoma is after complete removal of the tumor.

3. *Adenocarcinoma.* — Adenocarcinoma, simple or papillary, accounts for less than 10 per cent of parotid tumors. The microscopic appearance may be well differentiated and innocent, but the ultimate fate of the patient with adenocarcinoma is sufficient evidence of the treacherous nature of this tumor. Adenocarcinomas tend to be poorly demarcated and infiltrating. The rather confusing terms "oncocytoma" and "cylindoma" designate a type of adenocarcinoma. As a rule, the growth of an adenocarcinoma is more rapid than that of the other parotid tumors; for this reason patients with adenocarcinoma usually seek treatment earlier.

4. *Mixed Tumors.*—Approximately 75 per cent of parotid tumors are so-called "mixed tumors." These are not confined to the salivary glands; they have been described as occurring also in the lacrimal glands, the nares, the tonsils and the lips. The typical site of origin in the parotid is in a comparatively circumscribed area just above and in front of the angle of the mandible. Occasionally the tumor develops just anterior to the tragus, in which position it may be confused with an enlarged preauricular lymph node.

Mixed tumors usually appear in patients from 20 to 40 years of age. They grow slowly, and may reach a diameter of 10 cm. They are usually ovoid but sometimes lobulated. Microscopically the tumors are made up of three components: complexes of epithelial cells in cords or ductlike structures; connective tissue of the mucoid type, and a substance identified as cartilage or pseudocartilage. The genealogy of these tumors is not certain

There is a pronounced tendency toward recurrence following removal of these tumors Marshall and Miles[4] reported on mixed tumors of the parotid in 89 patients 25 of whom had undergone previous surgical treatment Ligation of the salivary ducts in dogs is said to produce mixed tumors, this gives rise to speculation as to the effect of interference with secretion following surgical removal of part of the gland

5 *Entodermal Cyst*—Sometimes known as adenolymphoma or papillary cystadenoma lymphomatosum, this rare and benign tumor probably arises from the lymphoid conglomerate that surrounds the first branchial cleft It is a bulky mass of lymphoid tissue more closely resembling that of the tonsil than that of the salivary gland It is dangerous to diagnose this tumor unless the lesion is bilateral, particularly if the diagnosis implies a less radical treatment than that indicated for mixed parotid tumors

6 *Tumors of Nonglandular Origin*—A variety of rare tumors arising from blood vessels, the facial nerve lymphoid tissue and fibrous tissue of the capsule of the gland must be remembered It may be helpful to recall that hemangioma is the most common tumor of this region in infants Preoperative clinical diagnosis of this group of lesions is not usually made

SOME COMMON MISCONCEPTIONS AND FEARS

We should now like to consider briefly some of the popular misconceptions and fallacies that have impeded progress in the treatment of parotid tumors

1 *The Fear of Facial Palsy*—This is the most common deterrent in the way of recommending or performing adequate surgical treatment of the parotid gland Too often there is a specter with an expressionless face, a drooping mouth and a tear moistened cheek which appears when we speak of operating on this gland We have found that major facial palsy occurs after division of one of the primary branches of the seventh nerve, but normal or nearly normal function returns after weeks or months The anastomotic branches anterior to the parotid isthmus are no doubt responsible for recovery

Facial palsy due to invasion of the seventh nerve by tumor is more frequent than that due to operation There would seem to be no rational objection to operation on the basis of fear of injury to the seventh nerve

A less known but equally troublesome result of nerve damage in the parotid region is the auriculotemporal (Frey's) syndrome[5] When the patient with this injury eats, the cheek becomes hot, flushed and moist with perspiration Hyperesthesia of the face is noted, especially during shaving

2 *The Fallacy of Waiting for the Tumor to Grow Larger*—The observation by McFarland[6] and by Kennon that the recurrence rate was higher after removal of small tumors may be the basis of the practice of "waiting for the lump to get bigger" There are two explanations of this seeming paradox one is that "small" tumors are commonly removed through short incisions, which give unsatisfactory exposure and result in incomplete removal, the second reason is that it is impossible to determine when a tumor is "small" Many parotid tumors present small surface swellings that mask a much larger underlying tumor It has also been observed that pinhead sized additional tumors may occur in juxtaposition to the large, more easily discernible tumor

3 *The Ugly Scar*—As we shall point out later, an anatomically correct incision may at the same time be cosmetically acceptable Small transverse incisions designed to parallel the branches of the facial nerve should be abandoned in favor of an incision that displays the gland in its entirety

4 *Fear of Salivary Fistula*—Fistula rarely or never develops after removal of large portions of the parotid gland A persistent fistula should make one think of persistent tumor

5 *The Pitfall of the Preauricular Lymph Node*—Mixed parotid tumor may be misdiagnosed as an enlarged lymph gland The common sites of occurrence of mixed tumors should be kept in mind If there is no obvious explanation for lymphadenopathy and the swelling continues to grow, the diagnosis of mixed tumor must always be considered

6 *The Pseudocyst*—The mixed tumor may be so soft and cystic as to lead the surgeon to

suppose that he is removing a cyst. A cystic swelling is too often thought to be innocuous. Recall that simple cysts are rare and that the diagnosis of adenolymphoma should not be made in the presence of a unilateral lesion.

7. *Roentgen Therapy.*—Nearly all parotid tumors are definitely radioresistant. Adenolymphoma is the one possible exception that would respond to roentgen therapy. McFarland, after following patients with parotid tumors for years, found that no benefit resulted from this form of treatment. Janes,[8] of Toronto, who studied this subject, knows of no instance in which cure has been effected by roentgen therapy. He has, however, observed deep, penetrating ulcers and intolerable pain which resulted from this treatment.

TECHNICAL CONSIDERATIONS

1. Anesthesia.—We routinely employ general inhalation anesthesia. Use of the endotracheal method permits easier access to the operative field, but the ordinary closed system with mask is satisfactory in some cases. Local anesthesia is frowned upon; inadequate anesthesia too often results in inadequate surgical handling. Further, the infiltration of tumor-bearing tissue and the obscuring of an already disturbed anatomic picture should be discouraged.

2. Incision.—One of two incisions may be employed. That preferred by Hamilton Bailey is a J-shaped incision from the level of the zygomatic arch, passing close to the pinna, curving around the root of the lobule of the ear to the tip of the mastoid process. If this incision does not permit visualization of the whole parotid gland, it may be extended downward on the anterior margin of the sternomastoid muscle (Fig. 1).

The incision we prefer is one that passes from the zygomatic arch downward, very close to the pinna of the ear, and continues to just behind and below the angle of the mandible, then turns abruptly below the body of the mandible in one of the natural skin folds of the neck (Fig. 2). The lateral flap of this incision is then undermined from the region of the external auditory meatus. This exposes the posterior and inferior margins of the gland. In order to injure the facial nerve at this point, the operator would have to cut completely through the superficial portion of the gland. If ligation of the external carotid is to be done prior to dissection of a large tumor, it is done before flap dissection is initiated. The medial flap is then dissected free until the zygomatic arch, the body of the zygoma, the anterior edge of the masseter muscle and the mental foramen have been reached. If the tumor permits, the sheath of the parotid gland is reflected from behind forward as part of the flap. The field is now prepared for the definitive surgical procedure.

At this point it is well to insert a warning against an attempt to enucleate the tumor. In nearly all parotid tumors enucleation is an illusion. Small satellite tumors or tentacle-like extensions of the parent tumor, neither grossly discernible, may be left behind in spite of the appearance of clean enucleation. Attempts to shell out apparently discrete lesions no doubt account for most of the high recurrence rate (30 per cent or more) of mixed parotid tumors. Local excision of a parotid tumor would seem to be as irrational as local excision of a malignant tumor of the stomach or rectum.

The origin of most parotid tumors in the superficial lobe of the gland is a factor in favor of the surgeon. *Superficial lobectomy* (a term suggested by Bailey) will provide adequate tissue excision in most cases.

If lobectomy or total parotidectomy is elected, preliminary ligation of the external carotid artery will obviate much troublesome bleeding. The longest portion of the external carotid without branches, and therefore the easiest to ligate, is that between the superior thyroid and lingual arteries.

The superior margin of the gland should be cleared first, followed by cleaning of the anterior-superior aspect of the superficial lobe. The buccinator branch of the facial nerve will be identified superficial to Stenson's duct. This branch may be used as a key to the depth of the proximal divisions of the nerve. Stenson's duct is left intact, and removal of the superficial lobe of the gland is carried out from before backward until the isthmus is reached. If it is necessary to divide Stenson's duct, it is excised at this point. The isthmus may now be divided, care being exercised to avoid the major divisions of the facial nerve.

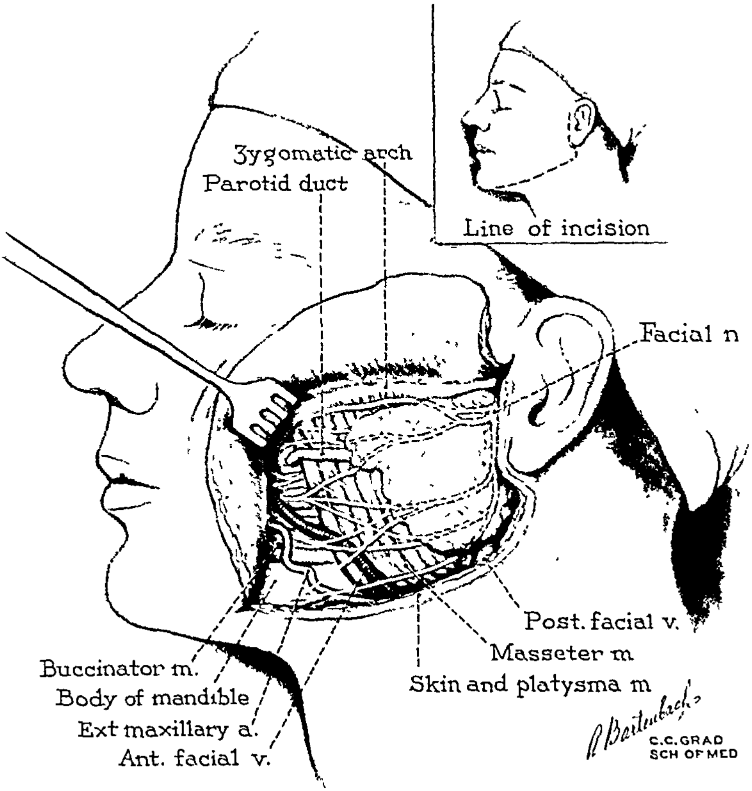

Fig 2—Incision utilized by authors. Note wide exposure obtained through an incision that will leave an unobtrusive scar

Bleeding may be encountered from the external carotid artery or its branches and the posterior facial vein, which lie posterior to the isthmus, usually deep to the seventh nerve. The auriculotemporal nerve may be severed at this same point, posterior to the isthmus, where its course nearly parallels that of the vessels. This maneuver completes the superficial lobectomy.

If it is necessary to excise the deep lobe of the gland for a large tumor wedged in the space between the ramus of the mandible and the mastoid process, it is best to carry out the dissection outlined above as a preliminary step. If there is a question of damaging the main trunk of the seventh nerve, it may be well to resect the tip of the mastoid process, as [illegible] Jones, in order to expose the stylomastoid foramen and trunk of the nerve. The posterior and lateral surfaces of the deep lobe are then freed so as to mobilize the lobe prior to the more hazardous dissection of its medial and anterior surfaces.

INJURY TO THE FACIAL NERVE

Permanent and significant facial palsy will result only if the *main trunk* of the seventh nerve is divided proximal to the parotid isthmus. Recovery of function is the rule after damage to branches of the nerve anterior to the parotid isthmus.

Transitory paresis due to division of lesser branches of the seventh nerve may be corrected by the use of supporting adhesive strips. If drooping of the mouth persists, Dahlberg's internal splint (a dental prosthesis) may be employed.[9]

Division of the main trunk of the nerve is best avoided by initial excision of the superfical lobe and by resection of the mastoid process if the course of the nerve is still obscure. In cases of permanent palsy, one of the plastic procedures, such as the Lodge fascial transplant,[10] J. B. Brown's technique of subcutaneous fascial strips attached to the temporal muscle,[11] or the employment of braided tantalum sutures[12] in similar fashion, is recommended.

SUMMARY

1. Attention is called to certain deficiencies in present knowledge related to the surgical anatomy and pathology of the parotid gland. Critical points of anatomy are reviewed, with special emphasis on the relations of the facial nerve.

2. Several common misconceptions concerning the management of tumors of the parotid gland are considered. The practices of waiting for tumors to become large, of performing inadequate surgery because of fear of injury to the facial nerve and the unjustified use of roentgenotherapy are particularly condemned.

3. The technics of subtotal parotidectomy (superficial lobectomy) and parotidectomy, with the patient under general anesthesia, are described. Emphasis is placed first on removal of sufficient tissue; preservation of the facial nerve is held to be of great importance, but secondary in importance to complete excision of the neoplasm.

4. Methods of management of temporary or permanent facial palsy are outlined.

RÉSUMÉ

1. On attira l'attention sur certaines insuffisances dans l'état actuel de nos connaissances relatives à l'anatomie chirurgicale et à la pathologie de la glande parotide. Certains points délicats de l'anatomie sont passés en revue en donnant une place prépondérante aux rapports du nerf facial.

2. On considéra plusieurs erreurs de conseption concernant le traitement des tumeurs de la glande parotide. La méthode qui consiste à attendre l'accroissement de la tumeur ou à réaliser une opération chirurgicale inadaptée par crainte de blesser le nerf facial, et l'emploi injustifié de la roentgenothérapie sont particulièrement condamnés.

3. On décrit les techniques de la parotidectomie sub-totale (lobectomie superficielle) et de la parotidectomie, le malade étant sous anesthésie générale. On insiste surtout sur l'ablation d'un tissu glandulaire suffisant; on tient pour trés importante la préservation du nerf facial, mais toutefois d'une importance secondaire par lapport à l'excision complète du néoplasme.

4. Les méthodes de traitment pour la paralysie faciale temporaire ou permanente sont décrites.

RESUMEN

1. Se destaca lo limitado de nuestros conocimientos actuales sobre la anatomìa, y anatomía patológica de la glándula parótida, revisándose algunos puntos fundamentales de su anatomía con relación especial al nervio facial.

2. Se analizan algunos errores frecuentes referentes al tratamiento de los tumores de la glándula parótida. La costumbre de esperar a que los tumores se hagan de gran tamaño o de intervenirlos quirúrgicamente de modo inapropiado por temor a lesionar el nervio facial, y el uso inadecuado de la roentegenterapia, son objeto de la crítica severa del autor.

3 Se describe la técnica de la parotidectomía subtotal (lobectomía superficial), y de la parotidectomía, sometiendo al paciente a la anestesia general Se insiste ante todo en extirpar suficiente cantidad de tejido parotídeo, dando suma importancia a la conservacion del nervio facial aunque ello es secundario a la resección total de la neoplasia

4 Se esbozan los métodos de tratamiento de la paralisis facial, temporal o permanente

RIASSUNTO

1 Richiama l'attenzione sopra talune lacune nelle attuali conoscenze sopra la patologia e l'anatomia chirurgica della parotide Passa in rassegna i punti salienti dell'anatomia della ghiandola, con speciale riguardo ai rapporti con il nervo facciale

2 Pone in rilievo parecchi falsi postulati rispetto la cura dei tumori della parotide Condanna, per esempio, sia la tendenza ad aspettare che i tumori diventino voluminosi, sia la frequenza di operazioni non complete per il timore di lesioni del nervo facciale, sia infine l'uso ingiustificato della radioterapia

3 Descrive la tecnica della parotidectomia subtotale (lobectomia superficiale) e della parotidectomia in anestesia generale Sottolinea la necessita' di asportare una quantita' sufficiente di tessuti, poiche' la conservazione del nervo facciale passa in seconda linea di fronte all'importanza di un'escisione completa dei tumori

4 Riepiloga i metodi di cura della paralisi temporanea o definitiva

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An Embarrassment of Riches

The response to Dr Acuff's request for contributions to this Special Issue was so generous as to exceed all expectations We regret deeply that we are unable to include them all even after dividing certain of the longer articles for presentation in two instalments and even after eliminating, one by one, *all* of the special departments which customarily appear in the concluding pages of the *Journal* every month

Since our only alternative would have been cutting down these valuable articles to a wholly unjustifiable extent, we are sure that both readers and contributors will approve our decision to defer publication of a few papers for one month only All remaining material will appear in the June issue of the *Journal* Each article will carry an explanatory footnote designating it as a contribution to the Special Issue

A Study Based on Forty-One Years of Thyroid Surgery

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MY EXPERIENCE with goiter is larger than the title indicates, because it began with my assistantship with Roux of Lausanne and Kocher of Berne, Switzerland. This, however, represents my personal work with the thyroid gland over a period of forty-one years (1909 to 1950).

If to these 11,139 thyroidectomies 523 ligations are added, the total number of thyroid operations will amount to 11,662.

Terminology.—For the sake of clarity the terminology used in this discussion should be made clear. Goiter may be classified into three main types: (1) diffuse parenchymatous goiter, (2) diffuse colloid goiter, and (3) nodular colloid goiter. Each of these three types is either (*a*) toxic or (*b*) nontoxic. The three main types may be defined as follows:

Diffuse parenchymatous goiter is a diffuse hyperplasia of normal thyroid parenchyma. The whole gland is usually involved. The gland may contain very tiny colloid nodules, which cannot be detected by palpation; clinically, however, the glandular hyperplasia remains a diffuse parenchymatous goiter until microscopically proved otherwise.

Before the advent of iodine prophylaxis the *diffuse colloid goiter* was much more common than it is today. This change is obviously due to the extensive iodization of the population.

Nodular goiter is a definite lump with a well defined capsule and clearly defined limits. There is nothing discrete about it; it may be rolled around within the gland itself. It may be single or multiple. Clinically speaking, whether this nodule is a true colloid or a mixed colloid and cystic nodule, whether it is a fetal adenoma (Wölfler) or not, or whether it is an incipient malignant growth, cannot always be told by palpation. Only the microscope will tell. It may be suspected; that is all.

In diffuse parenchymatous and colloid glands one frequently observes diffuse bosselations, diffuse nodulations, which may be confused with true nodules. They are not true nodules. They are not encapsulated; their limits are indistinct. They correspond to areas of localized hyperplasia surrounded by areas of involution.

Thyrotoxicosis.—Parry's disease, (Parry antedated Graves); Graves' disease; Basedow's disease; exophthalmic goiter; hyperthyroidism; morbodi Flajani, and thyrotoxicosis are all synonymous. The English called it Graves' disease because it was described by the Englishman, Graves. The Germans called it Basedow's disease because Basedow described it. The French called it goitre exophthalmique because of the exophthalmos. The Italians called it *morbo di Flajani* because Flajani described it. Mayo called it hyperthyroidism because he accepted the theory of hypersecretion of Moebius. Kocher called it thyrotoxicosis. Whatever it is called, the same changes in the basal metabolic rate, the same cardiovascular reactions, the same gastrointestinal disturbances, the same tendency to ocular signs, and the same nervous phenomena are present.

It does not seem justifiable to consider Graves' disease or exophthalmic goiter a different disease from *thyrotoxic nodular colloid goiter,* the so-called *toxic adenoma,* or *hyperfunctioning adenoma.* Fundamentally, they are the same, and are caused by hyperfunction of the thyroid. To be sure, their reactions may be in many ways different. A thyrotoxic diffuse parenchymatous goiter or exophthalmic goiter, developed in a thyroid physiologically normal up to the time of onset, reacts more violently than does a degenerated gland in which a nodular colloid goiter has developed. The response is the same, but the *degree of reaction differs.* It is still the same disease.

It has been said that the exophthalmos associated with exophthalmic goiter is a distinctive characteristic and does not occur with toxic adenoma. The statement is inaccurate. Exophthalmos does occur with toxic adenoma, but not so often and not to so marked a degree as with exophthalmic goiter. But again, it is only a matter of degree. In my series of 5,924 thyroidectomies for toxic nodular and diffuse colloid goiters, the incidence of exophthalmos was 0 5 per cent while the incidence of exophthalmos in 3 074 thyroidectomies for thyrotoxic parenchymatous goiters was 24 per cent Not only are the general symptoms the same, the treatment also is largely the same Both conditions respond to antithyroid medication, iodine, thiouracil and radioactive iodine as well as to surgical intervention

Comment—Table 1 shows that the frequency of diffuse and nodular colloid goiter exceeds that of diffuse parenchymatous goiter in a ratio of 3 to 1, that the sex incidence is 5 to 1 in favor of the female and that the global incidence of toxic goiter far surpasses that of the nontoxic type It is rather surprising to find that the majority of nodular colloid goiters are toxic

To call the hyperthyroid syndrome hyperthyroidism is inadequate since it can hardly apply to thyrotoxic patients with low metabolism To call the syndrome by the name of any one investigator is not desirable, nor is it just to the other scientists who have advanced our knowledge of the disease Until we know the true etiologic mechanism of toxic goiter therefore I shall call the hyperthyroid syndrome thyrotoxicosis This term is simple and clear

Ligation is no longer employed in my operations It has been replaced by administration of Lugol's solution and antithyroid medication combined and when necessary, by external roentgen treatment One cannot but note the high mortality rate (4 4 per cent) for so simple and short an operation Most of the ligations referred to in Table 2 were made prior to the advent of Lugol s solution and antithyroid medication and also prior to standardization of the clinical handling of such conditions

THYROIDECTOMY FOR NONMALIGNANT GOITER MORTALITY RATES

This study is based upon 10,947 thyroidectomies Operations for malignant goiter are not included Table 3 presents the mortality rates in statistical form One finds, contrary to expectation that nodular goiter carries a higher death incidence than does diffuse parenchymatous goiter Advancing age, with all its incidental decrepitudes no doubt accounts for the discrepancy

The death rate in thyroidectomy depends upon (1) preoperative preparation, (2) anesthesia, (3) judgment at the operating table (4) faultless and speedy technic, and (5) appropriate postoperative care

Preoperative Measures—After the physical and laboratory examinations are completed the patient is kept in bed A high calory diet with increased protein and carbohydrate intake is given three times a day Coffee tea alcohol and tobacco are tabooed It has been shown that tobacco raises the basal metabolic rate Patients with cardiac disease are hospitalized and given the usual treatment, iodine and propyl thiouracil are given simultaneously When cardiac compensation is established the basal metabolic rate is at a safe level and thyrotoxicosis is controlled, thyroidectomy is done Antithyroid medication consists of Lugol's solution alone in cases of moderate involvement with propyl thiouracil added if the condition is severe Appropriate cardiac medication is given if organic cardiac disturbances are present The basal metabolic rate is brought down to safe limits to or below plus 25, it is not wise to operate while a higher metabolic level exists

When Lugol's solution and propyl thiouracil medication do not bring about the expected remission a series of intravenous sodium iodide injections is given If even this proves insufficient a series of five to eight roentgen treatments is added

In cases of critically toxic goiter the intravenous injection of sodium iodide two to four times a day or oftener if need be is started at once and continued as long as the patient's condition remains threatening At the same time antithyroid medications Lugol s solution and propyl thiouracil are given to the limit

Roentgen treatment should not be undertaken during the early acute critical stage, it will almost certainly induce a severe thyroid crisis, in the same way as a ligation or a partial thyroidectomy would do if performed during the critical stage The patient would probably die

In such critically ill patients it is imperative to prevent dehydration and to provide for a high calory [illegible] n and carbohy-

TABLE 1.—*Statistical Summary*

Thyroidectomies				*Incidence, %*
Diffuse parenchymatous	3,189			28.6
Nodular colloid	5,696			51.2
Diffuse colloid	1,958			17.5
Malignant	192			1.72
Chronic thyroiditis	99			0.87
Thyroglossal fistula	5			0.04
Thyroidectomies	11,139			100
Ligations				
In 11,139 thyroidectomies				
Male patients	1,820			17
Female patients	9,319			83
Diffuse parenchymatous	3,189	Toxic	3,074	96.4
		Nontoxic	115	3.6
Diffuse colloid	1,958	Toxic	1,562	79.7
		Nontoxic	396	20.3
Nodular colloid	5,696	Toxic	4,362	76.5
		Nontoxic	1,334	23.5
Total benign goiters, 10,843				

drate. Frequent feedings, even hourly, are given through a nasal tube left in situ. Sedatives should be given freely until the critical condition is over. The same is true for antipyretics when the fever is high. Ice packs are useful. Transfusions are strongly indicated.

One must always bear in mind that some patients (11 per cent) are refractory to Lugol's solution. The same is true of thiouracil. For them, radioactive iodine should prove helpful. I have no experience with it as yet.

It is mandatory that no attempt at surgical intervention be made unless the patient appears safely ready for it. When that time comes the patient is given an intravenous injection of sodium iodide the day before the operation, whether he is thyrotoxic or not. I have made this rule ever since a patient with simple nontoxic goiter died of thyroid crisis after thyroidectomy. No patient is ever operated upon unless he has received preoperative iodine medication, no matter if he is nontoxic.

Anesthesia.—I do not believe in local anesthesia for thyroidectomy. Sodium pentothal and nitrous oxide are, in my judgment, the agents of choice.

When a patient is apprehensive and toxic, sodium pentothal is administered in his room, and when unconscious he is transported to the operating room, where nitrous oxide is administered. The patient is thus saved the stage of apprehension and nervous excitement, which is always detrimental. When the margin of safety is small, this safeguard may mean the success of the operation. At any rate, most patients are grateful to have been kept in ignorance as to the actual time of operation.

Intratracheal anesthesia is used when needed. A highly competent anesthetist is a gift of the gods; he reduces the mortality.

Judgment at the Operating Table.—When the patient is draped and ready for the opera-

TABLE 2.—*Ligation*

Total number of ligations	523
Ligations without thyroidectomy	98
Ligations followed by thyroidectomy	425
Total	523
Deaths in ligations	
Diffuse parenchymatous goiter	13
Diffuse colloid goiter	2
Nodular colloid goiter	8
Cause of Death	
Pneumonia	1
Cardiac disease	7
Shock	1
Thyroid crisis	12
Unknown	2
Sex	
Male	3
Female	20

tion, the surgeon's decision may mean life or death

When anesthesia has been complete for several minutes and the cardiac rate, which was elevated at first comes down to a safe level (90 to 110) and stays at that level, one may proceed with the operation If the cardiac rate does not come down but remains at the same high level as when anesthesia was started the patient is not fully ready for surgical treatment A cardiac rate that remains at a level of 125 or more means a cardiac rate of 175 or more at the end of the operation The remission is not yet within safe bounds and the operation must be postponed to a later date

Faultless and Speedy Technic—One stage or two stage operations? In my judgment *one stage, bilateral resection and isthmectomy* is the method of choice I have adhered to this principle throughout my 11 139 thyroidectomies I have not performed a single unilateral resection unless one of the two lobes was entirely normal and I have not performed a two stage thyroidectomy unless an emergency demanded it

If a patient has undergone adequate preoperative treatment and if he is deemed capable of going through a unilateral resection, I personally feel that he is able to stand the full operation Upon this principle I have acted all the way through

When the condition is a serious one, and after the patient has been fully anesthetized if I have any misgivings about the outcome I do not operate but postpone intervention to a more suitable time But when that time comes, I perform a bilateral and not a unilateral resection

The isthmus is always removed if only for cosmetic reasons If one leaves the isthmus one runs the risk of overlooking the pyramidal process It is a rule without exception to dislocate forward a lobe which appears to be normal In so doing one will discover a discrete small incipient thyroid nodule, which later may give rise to a recurrence or a malignant goiter

I feel that any surgeon who has fully mastered the technic of thyroidectomy who makes every motion count, so as to proceed swiftly though surely, and who, through experience

TABLE 3—*Mortality Rates*

Types of goiter		Deaths	Per cent
Diffuse parenchymatous,	3,189	60	1 8
Diffuse colloid,	1 958	15	0 76
Nodular colloid,	5,696	117	2 0
Total number of thyroidectomies			10,947
Total number of deaths			192

In 10 947 thyroidectomies for benign goiter, the total death incidence was 1 76 per cent

However, as the skill and experience of the surgeon grow, the death rate decreases From 1920 to 1930, thyroidectomies for benign goiter totaled 4 956 There were 75 deaths or 1 8 per cent

Type of Goiter	Deaths
Diffuse parenchymatous	
Toxic	23
Nontoxic	0
Diffuse colloid	
Toxic	10
Nontoxic	0
Nodular colloid	
Toxic	37
Nontoxic	5
Total number of deaths	75

From 1940 to 1950 3 043 thyroidectomies were performed for benign goiter There were 24 deaths or 0 8 per cent

Type of Goiter	Deaths
Diffuse parenchymatous	
Toxic	6
Nontoxic	0
Nodular colloid	
Toxic	16
Nontoxic	2
Total	24

In the last 1,000 thyroidectomies there were 3 deaths or 0 3% This series included

609 nodular colloid goiters	
Toxic	328
Nontoxic	281
111 diffuse colloid goiters	
Toxic	75
Nontoxic	36
245 diffuse parenchymatous goiters	
Toxic	231
Nontoxic	14
35 instances of chronic thyroiditis	
Riedel's	21
Hashimoto's	13
Syphilitic (discovered postoperatively)	1
Total	1,000

This survey shows clearly that a nontoxic goiter carries at operation a minimal chance of death Most of the deaths occur in the toxic group (70 to 5) has developed sound medicosurgical judgment ought to be able to do the same. There may be some exceptions, but in my opinion they are few.

Appropriate Postoperative Care.—As soon as the patient is returned to his room, he is given routinely an intravenous injection of sodium iodide. The injection is repeated if signs of impending thryroid crisis becomes manifest.

Intravenous physiologic solution of sodium chloride is routinely given. Blood transfusions are instituted when needed. Sedatives are given generously for the twenty-four hours after the operation.

THYROID CRISIS

A postoperative thyroid crisis is only a fulminating form of hyperthyroidism. It is a peracute thyrotoxicosis. The symptoms are the same; the only difference is a matter of degree. If we admit that thyrotoxicosis is caused by an exaggerated amount of thyroxin in the organism (the primary cause of phenomenon is not known) it is logical to admit that a thyroid crisis is due to a sudden flooding of the organism with thyroxin normally fixed in the tissues (about 25 mg.). The operation apparently acts as a releasing mechanism. Its modus operandi is not known.

If we do not know the true cause, we can, however, suspect beforehand that thyroid crisis may occur. The patients in whom a crisis is most likely to develop are the highly emotional, the highly thyrotoxic cardiovascular, the gastrointestinal with vomiting and diarrhea, and the asthenic patients. Special attention should be paid to them.

The thyroid crisis begins at the operating table; the cardiac rate is unduly high during the operation, and afterward it shows a tendency to go still higher. A few hours later it reaches 200 or more. The patient coming out of the anesthetic is unusually restless, tosses about in his bed, wants to get rid of his covers, wants to get out of bed, and especially wants to go home. He talks incoherently and becomes delirious. His delirium is not systematized, he has hallucinations, sees and talks to imaginary persons. The temperature rises to high levels (to 104 to 106 F.). I have observed a terminal temperature of 109 F. Death ordinarily ensues about twenty-four to thirty-six hours after the operation.

Fortunately, thyroid crises are no longer as frequent or as severe as they were formerly, but they do still occur.

Treatment consists of intravenous sodium injections as frequently as every two hours if the crisis is severe. An intravenous drip of dextrose solution, an oxygen tent, and sedatives are resorted to immediately. Blood transfusions are a "must".

Ice packing of the extremities, even of the whole body, is used to combat the fever. Aspirin is helpful for this purpose.

LINE OF CONDUCT FOR TREATMENT OF THYROTOXICOSIS

1. A thyrotoxic nodular goiter is "surgical" as soon as it can be safely operated upon.
2. The early mild forms of thyrotoxicosis in children and young persons should be treated medically unless a special contraindication (nodular goiter) is present. Roentgenotherapy and the administration of Lugol's solution are the methods of choice.
3. Early, well established, typical thyrotoxicosis calls for surgical intervention.
4. Well advanced conditions demand operation as soon as it can be done.
5. Severe advanced conditions of long standing have passed the surgical stage and become medical again. The use of antithyroid medication, including radioactive iodine, is the method of choice. If the patients can be made safely surgical risks, thyroidectomy must be done without delay.
6. The fulminating forms of thyrotoxicosis, the cardiovascular, gastrointestinal and asthenic types, are essentially medical. Any surgical treatment, be it only a simple ligation, or even roentgen treatment during the intense wave of hyperthyroidism, may lead to disaster. Only when remission is substantial and of some duration should operation be contemplated.
7. Patients with mental disease complicated by thyrotoxicosis should be given the benefit of surgical treatment. If thyrotoxicosis is not present, thyroidectomy has little to offer. For thyrotoxic insanity, operation offers complete relief.

8. A certain degree of myocarditis or valvular lesions (provided they are well compensated) is no contraindication to thyroidectomy. However, auricular fibrillation with unsystematized arrhythmia should be well controlled before operation is resorted to.

9. Any thyrotoxic goiter showing a tendency to relapse after remission should be operated upon. The interval operation is the safest procedure.

EXOPHTHALMOS

In 11,139 thyroidectomies and 523 ligations, there were 1,066 instances of exophthalmos, an incidence of 9.14 per cent

Progressive exophthalmos, 23, or 2.1 per cent of 1,066.

Unilateral exophthalmos, 33, or 3.1 per cent of 1,066.

Of 3,074 toxic diffuse parenchymatous goiters, exophthalmos was present in 764, or 24 per cent. Of 5,924 toxic nodular and diffuse colloid goiters, exophthalmos was present in 302, or 5 per cent.

Table 4 disposes very well of the claim that exophthalmos does not occur in cases of toxic nodular goiter. Not only is it unquestionably present in adults with nodular goiter; the same is true of children. Table 14, to be presented later, shows that exophthalmos was present in 51 of 105 thyrotoxic diffuse parenchymatous goiters, in 6 of 50 thyrotoxic diffuse parenchymatous goiters, and in 2 of 31 thyrotoxic nodular goiters.

The contention, therefore, that exophthalmic goiter, Basedow's disease, Graves' disease, thyrotoxic diffuse parenchymatous goiter, whatever one chooses to call it, is a different disease from the so-called "toxic adenoma" of Plummer because of the absence of exophthalmos in the nodular type does not hold true.

It is my impression that exophthalmos is less common and less severe than it was before the advent of iodine and antithyroid medication. Something has changed the behavior of the toxic thyroid. They are no longer as severely toxic as before. The most probable explanation is that prophylactic iodine medication has resulted in this change.

Another good reason for the reduced incidence of exophthalmos is the exophthalmometer. Before its advent, surgeons used to label as exophthalmos any retraction of the eyelid (Dalrymple sign). Measuring with the exophthalmometer often indicates that exophthalmos is not yet present

Exophthalmos in Thyrotoxicosis.—In the majority of instances there seems to be a direct relation between the severity of thyrotoxicosis and the degree of exophthalmos. The latter increases with the thyrotoxic syndrome or subsides with the disappearance of the toxic goiter; hence the conclusion that exophthalmos is of thyroid origin. This point of view is corroborated by the fact that, as has been proved experimentally and clinically, forced feeding of desiccated thyroid can and does produce the thyrotoxic syndrome as well as the exophthalmos associated with thyrotoxicosis It is further substantiated clinically by the results obtained with thyroidectomy.

However, in recent years, owing to the research work of Loeb and Friedman (1932),

TABLE 4.—*Progressive Exophthalmos: Distant Results*

Stationary	6	1 after 14 months	Average, 53 months
		1 after 108 months	
		1 after 54 months	
		1 after 21 months	
		1 after 48 months	
		1 after 73 months	
Recessive	4	1 after 26 months	
		1 after 16 months	
		1 after 38 months	
		1 after 16 months	
Progressive	13	Persistent double vision	2
		Loss of vision	1
		Orbital decompression	2(1 improved, 1 died)

Friedgood (1934), Brian (1936) and others, the trend has been to regard the *pituitary* gland as the primary cause of thyrotoxicosis and its concomitant exophthalmos. The claim is made that an excess of thyrotropic hormone of the anterior pituitary in the blood acts as the primary initiator and induces hyperfunction, thus producing both the thyrotoxic syndrome and the exophthalmos.

There seems to be no question that there is an intimate functional relation between the thyroid and the pituitary in production of the thyrotoxic syndrome, but what the intricate mechanism is, we do not know. The excess of thyrotropic hormone does not seem to be an adequate explanation, since in diseases in which the thyrotropic hormone is abundantly present, such as acromegaly or spontaneous myxedema, no thyrotoxic syndrome or exophthalmos appears (Friedgood).

A frequent characteristic of thyrotoxic exophthalmos is the *absence of mydriasis*. This sign is quite interesting. Stimulation of the cervical sympathetic nerve produces exophthalmos with mydriasis. This is to be expected, since resection of the cervical sympathetic nerve produces enophthalmos and myosis.

In adenoma of the anterior pituitary in acromegaly and in the Cushing syndrome exophthalmos is observed long before the other clinical symptoms occur. Here also mydriasis is absent. This absence of mydriasis would make it appear that thyrotoxic exophthalmos and thyrotropic exophthalmos are the same.

One should remember that exophthalmos experimentally produced with the thyrotropic hormone is by no means constant (9 out of 30 guinea pigs; Friedgood, 1934) and that the effect of thyrotropic hormone upon the thyroid is fleeting and soon ceases to be active no matter how long it is administered. On the other hand, it would appear that thyrotropic hormone does not produce exophthalmos by activating the thyroid gland, since exophthalmos is best obtained in thyroidectomized animals.

Another significant fact is that exophthalmos is observed only with thyrotoxic goiter and not with simple nontoxic goiter. Furthermore, postoperative progressive exophthalmos is observed only after thyroidectomy for *thyrotoxic* goiter and never after thyroidectomy for simple *nontoxic goiter*, no matter how extensive the latter operation has been. Now, if thyroid insufficiency must be present to allow the thyrotropic hormone to produce exophthalmos, why is not exophthalmos present in cases of postoperative myxedema following thyroidectomy for simple nontoxic goiter?

That exophthalmos can be explained on the basis of disturbed autonomic control is perhaps partically probable, but the role of the sympathetic system is not clearly understood. It must be admitted that intimate mechanism responsible for the production of exophthalmos is still unknown.

However, it is not difficult to understand the *mechanical* mechanism that induces the eyes to bulge. It is known that the retrobulbar tissues, fat and muscles, undergo trophic disturbances and become edematous, and that leukocytic infiltration takes place. On the other hand, the orbital space is a pyramid widely opened outside and sharply pointed inside. The walls of the pyramid, being completely bony, are totally inelastic, and pressure from within must of necessity push the orbital content forward and outward. Thus it becomes obvious that if the orbital muscles become unduly hypertrophied and the orbital fat becomes so edematous as to occupy most of the orbital space, the globus oculi must necessarily protrude. There is no other possibility.

Table 4 shows that the incidence of exaphthalmos in cases of diffuse parenchymatous goiter is 764, or 24 per cent. It shows also that exophthalmos in diffuse and nodular goiters is 302, or 5 per cent. In 23 of the total of 1,066 cases of exophthalmos the condition became progressive after the operation; therefore one may conclude that in 2.1 per cent of cases the exophthalmos observed will become progressive.

Progressive Postoperative Exophthalmos.—This condition, although not common, has been and still is the most baffling problem confronting the physician and surgeon. It is frequently the only remnant of the disease that once existed. Its characteristic is to be progressive, leading sometimes to almost complete extrusion of the eyeballs, to total blindness, and to panophthalmitis with all its consequences.

Progressive exophthalmos is more common in men than in women. In this connection, it is interesting to recall that Marine observed male rabbits to be more susceptible than female rabbits to the experimental production of exophthalmos.

The majority of thyrotoxic patients with exophthalmos after thyroidectomy recover fully; the thyrotoxic syndrome disappears altogether, or almost so. Exophthalmos, however, when present, subsides more slowly; sometimes it remains permanently stationary, with no untoward effect on the patient.

In a few instances, sometimes months or even years after thyroidectomy, exophthalmos reappears and follows a progressive course until the lids can no longer cover the bulbus. The lids become extremely puffy; the ocular movements are more and more restricted; the conjunctiva becomes congested and swollen to such an extent that it henriates through the lids. Lacrimation becomes very annoying. Being unprotected, the cornea becomes inflamed, and finally ulcerated; panophthalmitis follows. In the meantime the eyesight has been totally lost. The only course open is enucleation; otherwise, death will ensue. Ordinarily the patient has a low metabolic rate.

The theory that thyrotoxic exophthalmos and progressive postoperative exophthalmos are produced by the same mechanism seems justified. To be sure, there are differences. In thyrotoxic exophthalmos the mobility of the eyeball is not impaired, or at least, very little; in progressive postoperative exophthalmos the impairment is marked. The upward and downward rotation ceases first; later the inward and outward motions disappear. In thyrotoxic proptosis there is usually no chemosis. In the postoperative progressive exophthalmos hyperthyroidism is usually the rule; in thyrotoxic exophthalmos the reverse is usually true.

In both forms of exophthalmos mydriasis is absent. In the two forms, also, the trophic orbital disturbances are the same.

Changes in the retina occur in both forms of exophthalmos, but only in the last stages of the disease.

In the last analysis, however, these two forms of exophthalmos must have a common origin. Probably the trophic disturbances of the orbital muscles are primarily caused by stimulation of the sympathetic nerve, which in turn brings about trophic disturbances. Biological chemical reactions must also play a part in the production of the syndrome.

One thing remains to be explained: Why is it that, even after all other thyrotoxic symptoms have subsided, exophthalmos still persists for a long time and sometimes permanently? Probably because the eyeball, having protruded for so long a time, has lost the "right of domicile" in the orbit; it has acquired new relations; connective tissue and retrobulbar fat have filled the dead space left by the eyeball while it protruded, and it is difficult or even impossible for the globus oculi ever to return to the normal position.

Why is it that thyrotoxic thyroids do not all produce exophthalmos? We do not know.

After seeing a large series of thyrotoxic goiters, one notices that in certain thyrotoxic patients the toxic effects of the hyperthyroid gland seem to center their deleterious effects upon certain organs or systems of organs. In some patients the cardiovascular system seems to be affected disproportionately to the other organs. In other patients it is the gastrointestinal system that is heavily attacked by thyrotoxicosis; vomiting and diarrhea may be intense. In still other patients the ocular system is most markedly involved. This would lead one to believe that certain organs or systems of organs may be unduly *sensitized* to thyroxin, while others are resistant to it. On the other hand, the concept of "sensitization" as an activator may well have a reverse, namely, act as an inhibitor, as for instance, with low metabolism.

Treatment of Exophthalmos.—One treats the thyrotoxicosis. The earlier this condition is treated and cured, the greater the chances that exophthalmos will subside and disappear. One should always remember that whenever ocular signs appear *early* in cases of thyrotoxic goiter, that condition, if allowed to go unchecked, will quickly become severe.

The Exophthalmometer.—In the early stages of thyrotoxicosis, exophthalmos is frequently diagnosed when in reality it is not present; at least, not yet. The presence of the Dalrymple sign, namely, retraction upward and downward of the eyelids, is responsible for the mistaken diagnosis. Measurements with the exophthalmometer will soon determine whether exophthalmos is present or not. Measurements in excess of 18 must be regarded as abnormal, especially if there is a difference in the measurements of the two eyes.

Since patients with progressive exophthalmos are in the majority of instances hypothyroid, thyroid extract is given. To this iodine is added, the idea being that it will be helpful if thyrotoxic signs are present and, if not, will act as a deterrent to the edema of the tissues.

Cervical Sympathectomy.—Cervical sympathectomy as performed in the early days has been abandoned. The new antithyroid drugs have proved disappointing except when hyperthyroid symptoms are present.

Electrocauterization of the Hypophysis and its Stalk.— This procedure carries with it the danger of pituitary deficiency, manifested by general weakness, a very low basal metabolic rate, sexual impotence, testicular atrophy and hypoglycemia (McCullagh). However, some good results have been obtained.

Irradiation of the Pituitary.—This therapy has been found useful in a few cases, but has given totally negative results in others.

Orbital Decompression of Naffziger.—Orbital decompression consists in removing the superior orbital plate, unroofing and removing the covering plate of the optic foramen. This will permit the orbital content to move upward and, in consequence, will do away with the intraorbital forward push on the eyeball. It is mandatory to unroof the optic foramen so as to release pressure on the optic nerve. A pressure bandage over the tightly closed eyelids is necessary in order to push the eye backward.

Orbital decompression should be done only when the optic nerves show signs of being destroyed.

To Be Continued in June Issue

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Fracture Dislocation of the Acetabular Rim with Dislocation of the Hip and Traumatic Sciatic Paralysis

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INJURIES to the sciatic nerve associated with fracture dislocation of the acetabular rim may be primary or secondary The diagnosis of primary injury to the nerve may not be made by the attending physician until several weeks after injury, when casts traction apparatus or splints are removed and the patient attempts movement of the extremity, as demonstrated in our Case 7 Correct management of serious primary injuries to the sciatic nerve complicating fracture dislocation of the hip is important, and all such injuries should receive prompt surgical attention

To avoid irreparable damage with permanent disability, the physician should make a thorough primary examination for evidence of involvement of peripheral nerves and apply immediate treatment The recognition of paralysis immediately after injury will eliminate the possibility of ascribing the paralysis to pressure from callus or scar formation or to treatment This would avoid embarrassment when the question of permanent disability, compensation or litigation occurs Secondary injuries to the sciatic nerve are attributed to hematoma scar and callus inclusion exerting pressure and causing eventual dysfunction of the nerve Common peroneal paralysis is the most frequent type and may be ascribed to local pressure from casts or bandages over the upper third of the fibula One of us (Meyerding[1]) observed stretching of the common trunk of the sciatic nerve over the sharp edge of the upward displaced fragment of the fractured acetabulum with peroneal paralysis (Case 1) Once such secondary changes have taken place, surgical measures may offer benefit (Cases 2 and 8) Time and conservative measures are the only factors that may be of benefit, thereafter Bado and Torres Larcebo[2] wrote

Fracture of the cotyloid cavity at the union of its upper and middle thirds with upward and backward displacement of the head of the femur is frequently accompanied by a lesion of the sciatic nerve that clinically affects the function of the muscles innervated by its popliteal branch This fact is of interest, inasmuch as the lesion incidentally involves the branch of the sciatic nerve as a whole The presence of paralysis greatly delays the functional recovery of the limb area, is of considerable prognostic significance, always requiring specific treatment From the anatomical standpoint, the fracture separates the anterior and posterior portions of the pelvic arch and includes a fracture of the posterior portion of the edges of the acetabulum that allows a backward displacement of the femur bone that appears in internal rotation

GENERAL PRINCIPLES OF TREATMENT

Careful inquiry as to the time and nature of the accident may give valuable clues to the type of injury to be anticipated Thus, as will be demonstrated in our reports of cases, the sudden impact in head on collisions while the subject is in a sitting position predisposes to the type of injury under consideration The advent of fast moving passenger vehicles, such as automobiles and airplanes has increased the frequency of injuries of the hip joint Fractures of the acetabulum in older persons often result from modern transportation accidents The hip joint of the young is vulnerable to epiphyseal separation because the epiphyses have not been fused, after fusion of the epiphyses, severe traumatic impacts are likely to cause fractures that may involve the rim of the acetabulum

Fracture dislocation of the hip occurs most easily when the thigh is flexed at a right angle and the femur is adducted In this position the femoral head is held mainly by the posterior capsule At the time of accident, in our series of cases, the thighs were not fully adducted and flexed, the femoral head was still in contact with the posterior and superior rims of

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From th Mayo Clinic
*Fellow undation
Read at College of
Surgeons 1949

the acetabulum, and fracture dislocation of the rim occurred. The injuries resulted from application of a powerful force through the long axis of the flexed femur. The acetabular margin was fractured, and the fragments were displaced upward and backward, presumably by the dislocated head of the femur (Case 1, Fig. 1*a*). In some instances the fragments were in the region of the sciatic notch.

Posterior dislocations usually are easily diagnosed at physical examination, on the basis of the internal rotation and adduction deformity, the presence of a palpable mass posterior to the hip joint, and shortening of the affected extremity. If seen early, they usually may be reduced by the classic method of Bigelow. Roentgenologic examination of both hips should be made, for this may disclose, as in Case 5, bilateral fracture of the acetabular rims with displaced fragments of the left rim and femoral head. Postoperative roentgenograms also should be taken, since they may show displaced fragments of the fracture of the acetabular rim that were not detected before reduction of the dislocation, as in Case 6.

In acute fractures of the acetabular rim with dislocation of the femoral head and sciatic paralysis, immediate surgical intervention is advisable. The general condition of the patient frequently will determine the extent of primary treatment. Whenever possible, reduction of the dislocation of the head of the femur should be undertaken immediately with the patient anesthetized; when this is not possible, traction applied to the affected extremity may result in reduction. After reduction of the femoral head, the acetabular fragments may be aligned, or if this cannot be done satisfactorily, they may be excised. The sciatic nerve may be found to be stretched over or even divided by the sharp edges of the displaced acetabular fragments (Case 1, Fig. 1*a*). Hematomas, if present, may be evacuated from within the nerve and surrounding structures. The sciatic nerve may be stretched, contused or partially or completely severed. Surgical intervention and end-to-end anastomosis of the severed ends of the nerve are indicated. Postoperative care probably is best carried out with the patient in a plaster-of-paris spica cast extending to the toes. When the sciatic nerve has been damaged or sutured, the cast is applied with the patient's thigh extended, the knee flexed 70 degrees, and the foot at a right angle. The patient is turned on one side or on the abdomen, and his position is changed frequently for his comfort and to prevent pressure sores. When nerve suture has been done, the cast should remain in place approximately ninety days, to prevent interference with the healing and regeneration of the nerve. After this time weight bearing with the aid of crutches should be allowed for three months. If at the end of this time there is satisfactory healing of the fracture and no degenerative changes have occurred within the femoral head, full weight bearing may be permitted. Foot-drop must be supported by means of right angle splints or splint plaster casts while the patient is recumbent and with the right angle catch brace when the patient is ambulatory.

In the presence of old or malunited fracture of the rim of the acetabulum with dislocation of the head of the femur and paralysis of the sciatic nerve, reduction of the dislocation may be extremely difficult. The bony fragments must be excised to relieve tension on the sciatic nerve or to achieve proper coaptation for end-to-end anastomosis when required. Even with the hip exposed and under direct vision, it may be impossible to accomplish reduction. In Case 1 of this series, after the head of the femur was dissected free, so much scar tissue was found that it was impossible to reduce the hip. However, with heavy skeletal traction applied postoperatively, the hip was reduced in approximately three weeks. When the foregoing measures do not produce the desired result, subtrochanteric osteotomy will permit correction of the adduction and internal rotation deformity; after maximal correction has been obtained, fixations by means of a spica plaster cast should be maintained until satisfactory union has occurred.

COMPLICATIONS

Trophic ulcers result from pressure on and paralysis of the sciatic nerve. Undue pressure or irritation, as in Cases 1 and 2, may be the inciting cause of ulcer formation. Great care should be taken to avoid this complication.

Foot-drop which persists after a year in all probability will be permanent. This deformity causes stubbing of the toes and an awkward gait The patient usually requires a brace to hold the foot up while he is ambulatory, or he must undergo surgical treatment for establishment of some form of permanent internal support

Aseptic necrosis after injuries, fractures or dislocations of the hip has been reported with increasing frequency It is a serious complication, it prolongs convalescence and increases the amount of permanent disability when it follows fracture dislocations and injuries to the sciatic nerve

Post traumatic arthritis may develop early and cause disability, pain, stiffness and deformity This disabling condition also may develop slowly over several years and later require arthroplasty or arthrodesis of the hip

REPORT OF CASES

Case 1 —*Fracture of Rim of Left Acetabulum with Dislocation of Head of Femur and Traumatic Sciatic Paralysis and Foot Drop* —A man 39 years old was seen on Aug 31 1944 He said that ten weeks prior to his admission he had fallen asleep while driving an automobile and had sustained an injury of the left hip He had been treated for fifteen days by means of 15 pounds (6 8 Kg) of skin traction to the left leg, then a pin had been inserted through the distal end of the femur and 16 pounds (6 8 Kg) of skeletal traction had been applied for six weeks The pin wounds became infected, and the pin was removed two weeks prior to his admission to the clinic After this he had been up and about on crutches, but he said the deformity and pain in the hip with inability to dorsiflex his foot had caused him to seek further consultation

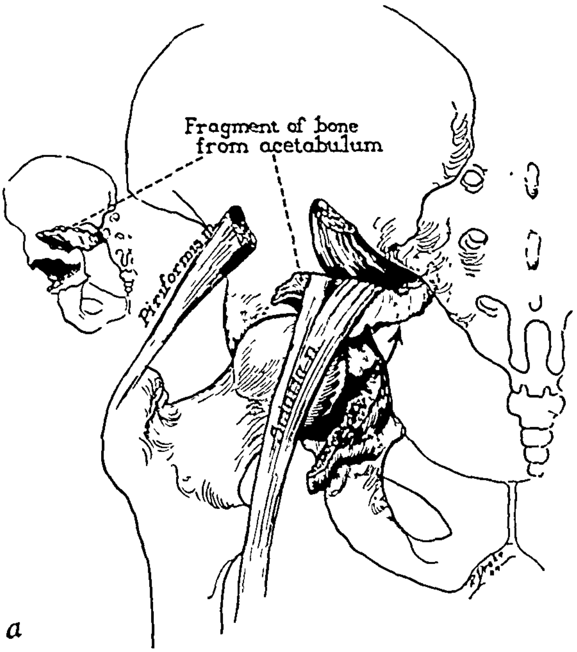
The man was 5 feet 11¾ inches tall (182 cm), he weighed 180 pounds (90 Kg) The systolic blood pressure, expressed in millimeters of mercury, was 108 and the diastolic 68 The pulse rate was 80 beats per minute The temperature was normal The patient was disabled and in pain as he lay in bed, the left leg was partially flexed and internally rotated, with visible shortening There were two holes in the skin above the left knee, pus was draining from the inner one There was tenderness over the course of the left sciatic nerve and greater trochanter, with foot drop There were recent scars on the face and arms Roentgenograms of the left hip (Fig 1*b*) showed upward and posterior dislocation of the left femoral head and a large fragment of bone comprising the posterior wall of the acetabulum which had been fractured and dislocated backward and upward, with several small bony fragments

Exploration of the sciatic nerve and reduction of the hip, with removal of bone fragments, was advised by the neurosurgical and othopedic consultants Operation was performed on September 8 A posterior oblique incision was made over the left hip and a large fragment of bone was found to be displaced upward, the sciatic nerve was stretched over the top of it (Fig 1*a*) The outer branch of this nerve showed marked atrophy as a result of pressure, the nerve root lay over a sharp eminence which was almost knifelike The displaced fragment of bone was removed, releasing pressure on the nerve The fragment was 1½ inches (3 7 cm) wide and 1 inch (2 5 cm) thick The head of the femur was visible, it was caught in dense scar tissue, which was excised It was not possible to reduce the femoral head, even when great force was employed together with bone skid It was deemed inadvisable to continue with further surgical treatment at that time, the patient was returned to bed Skeletal traction of 35 pounds was applied seven days later, through a Kirschner wire passed through the upper end of the tibia, after another unsuccessful manipulation The wound in the hip had healed by primary intention Three weeks later the patient experienced a snapping sensation He said he could rotate the leg externally and that he had less pain Roentgenologic examination showed the head of the femur in place in the acetabulum the Kirschner wire was removed and a plaster of paris spica cast was applied which extended to the toes The patient was dismissed from the hospital two and a half months later, and returned home The cast was removed five months later, at which time roentgenologic examination showed that the head was reduced The patient had about 80 per cent normal motion of the hip, foot drop was still present

The patient returned for observation fourteen months after operation, at which time examination showed satisfactory progress Roentgenograms (Fig 1*c*) disclosed the femoral head in position in the acetabulum A brace for the foot drop had been applied, and an ulcer in the calf of the leg had resulted The patient was still walking with the aid of crutches when he was last heard from in 1948, three and a half years after his operation

Case 2 —*Fracture Dislocation of Posterior Rim of Left Acetabulum With Dislocation of Hip and Secondary Traumatic Paralysis of Sciatic Nerve* —A housewife 55 years old was driving an automobile on May 29 1947, when it left the road She sustained multiple injuries, immediately after this she was taken to a hospital, where a diagnosis was made of (1) fracture of the left clavicle, (2) fracture of the third, fourth, and fifth left ribs, (3) compound fracture of the left elbow and (4) fracture of the left hip and acetabulum. She was not unconscious. After receiving emergency treatment, she was brought 1,000 miles to the clinic, on the date of accident, within twenty-six hours by airplane, so that additional consultation and treatment could be carried out.

The dislocated hip, with fracture of the acetabulum (Fig. 2*a*), was treated by passing one Kirschner wire through the left trochanteric area and another one just above the left femoral condyle, so as to produce traction downward and laterally. Wounds of the left elbow were débrided, and the fracture involving the articular surface of the elbow was reduced and held with a Kirschner wire which was passed through from side to side and the end of the humerus impacted against the lower fragment. A cast was applied.



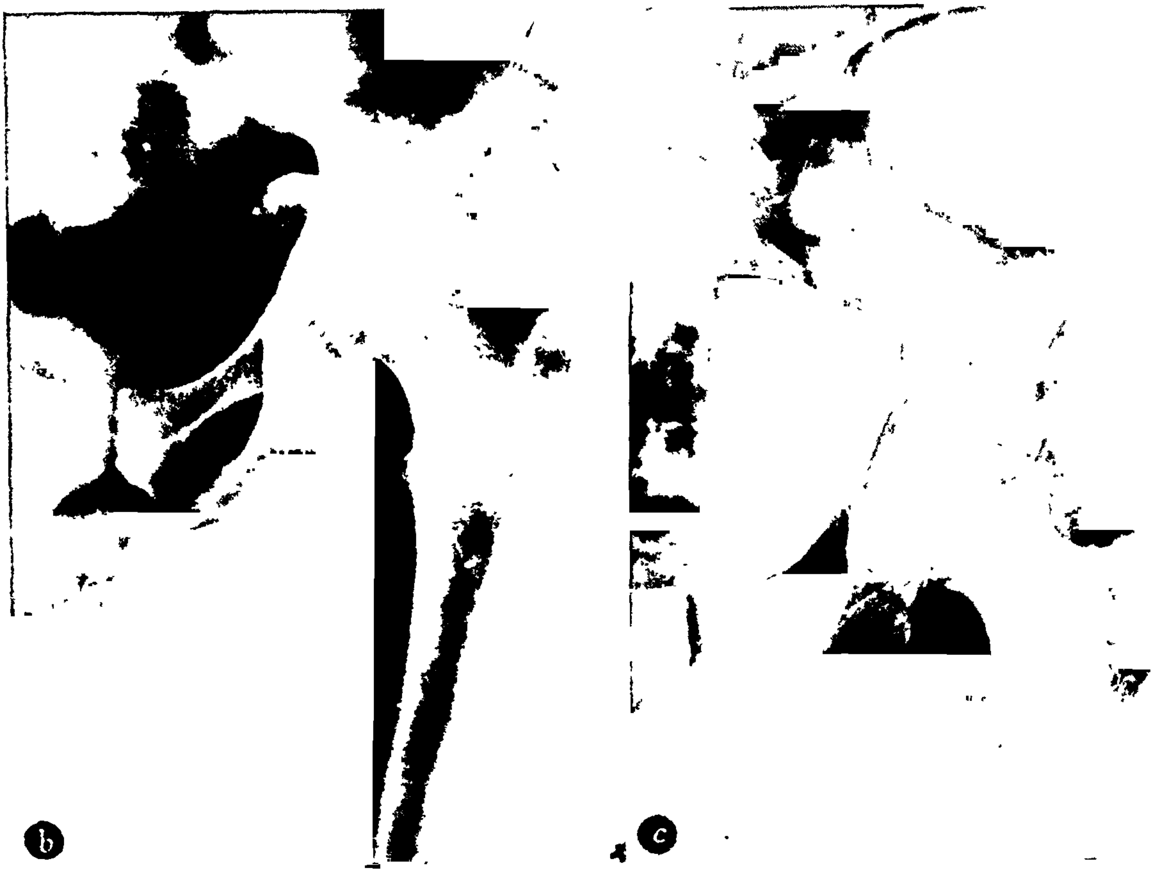


Fig. 1.—Drawing (*a*) made at time of operation on patient in case 1, showing fracture of left acetabulum, with bone fragments displaced backward and upward, and posterior dislocation of the hip; the components of the sciatic nerve were stretched over sharp edge of displaced fragment; *b*, fracture of posterior rim of acetabulum, with posterior and upward displacement of fragment and dislocation of hip; small fragment of bone inferior to hip; this patient had primary sciatic paralysis; *c*, hip joint reduced, fourteen months after fracture dislocation.

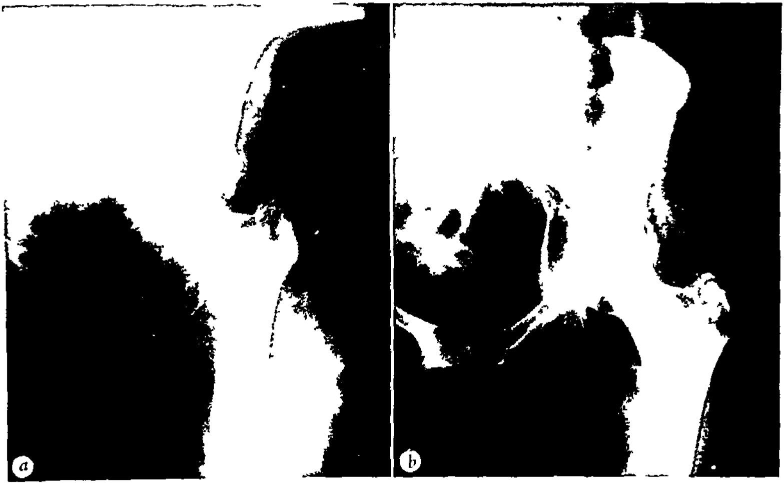


Fig 2—Fracture of acetabulum (*a*) with posterior medial dislocation of head of femur and also fracture of pubes and ischium in region of symphysis in case 2, there was no primary paralysis in this case but secondary paralysis occurred postoperatively at about the tenth week, *b*, satisfactory healing of multiple fractures and reduction of dislocated hip

Blood was transfused to the patient twice within eight days The wires were removed from the left elbow on the fifteenth postoperative day, from the left trochanteric region of the forty third day and from the lower end of the femur on the fifty third postoperative day

About the tenth week, weakness of dorsiflexion of the left foot was noticed This weakness extended over the lower left extremity The neurologist found paralysis to be extensive enough to warrant exploration of the sciatic nerve On September 30, 1947, or thirteen weeks later, the left sciatic nerve was explored and found to be intact It was freed from scar tissue through a Kocher type of incision Examination of the site of fracture showed the bones to be firmly united

No evidence of primary paralysis had been noticed either immediately after the accident or on arrival of the patient at the clinic twenty six hours later Evidence of paralysis appeared about ten weeks after the accident, secondarily

The foot drop was treated with a plaster splint which maintained the foot at right angles

Eleven months after the patient s injury, roentgenograms showed satisfactory position of the fragments and that the hip was reduced (Fig 2b), the sciatic nerve showed gradual improvement the legs were of equal length, rotation was about normal There was still some degree of swelling in the anterior tibial muscles of the foot The patient was advised to increase her activity and to receive physical therapy Roentgenograms showed that the hip was reduced and that the fracture of the acetabulum was in good position

Case 3—*Fracture of Posterior Rim of Acetabulum, With Posterior Dislocation of Right Hip and Primary Paralysis of Sciatic Nerve*—A man 35 years old while driving an automobile which overturned in April 1945, sustained fractures of the left ankle, the right forearm and the posterior rim of the right acetabulum, with posterior dislocation of the hip and paralysis of the sciatic nerve He was hospitalized for seven months during which time treatment consisted of manipulation and the use of casts There was anesthesia of the right foot and the lateral aspect of the right leg, with foot drop Sensation and foot drop slowly improved At the time of his admission to the clinic, he was getting about with the aid of crutches, he came for consultation twenty eight months after his injury because of increasing pain and disability involving the right hip

Roentgenograms taken twenty eight months after injury showed the right hip apparently undergoing

Fig. 3.—Roentgenograms made twenty-eight months after fracture of acetabulum, dislocation of right hip and paralysis of sciatic nerve in case 3, showing apparent aseptic necrosis, overgrowth of bone about displaced fragments and posttraumatic hyperthrophic arthritis.

aseptic necrosis, with overgrowth of bone about the displaced posterior rim of the acetabulum and posttraumatic hypertrophic arthritis (Fig. 3).

On Sept. 27, 1947, about two and a half years after the original injury, exploration of the right sciatic nerve was performed. Although the nerve was found to be somewhat thinner than normal, there was no evidence of complete severance. A vitallium cup arthroplasty was performed on the right hip at this time, after which the patient made an uneventful convalescence and returned home with improved motion and less pain, but no change in the sciatic paralysis.

Case 4.—*Traumatic Fracture of Posterior Rim of Right Acetabulum, with Dislocation of Hip, and Traumatic Sciatic Paralysis.*—A man 31 years old was seen in September 1945, at which time he said he had been in a head-on collision in April 1942, sustaining a severe injury to the right hip. Examination and roentgenograms disclosed a fracture of the posterior rim of the right acetabulum, with dislocation of the hip and paralysis of the right sciatic nerve. With the patient under the influence of general anesthesia, the dislocation of the right hip was reduced, and a detached fragment of the acetabulum, thought to be in good position, was left in place. The patient was placed in a plaster spica cast for one month; after it had been removed he was permitted to be up and about on crutches, but was unable to dorsiflex his foot and had not been able to do so up to the time of his admission to the clinic. Two and a half years after the accident (October 1944) severe pain in the hip developed and roentgenologic examination disclosed aseptic necrosis of the head of the right femur. A walking caliper was prescribed for the patient, which he used intermittently for a year.

Three and a half years after this patient's injury, sensation had improved in the foot. We did not feel that surgical treatment was indicated at the time, and advised him to return to his physician for further care and observation.

Case 5.—*Bilateral Fracture of Acetabulums, With Dislocation of Hips and Primary Paralysis of Right Sciatic Nerve.*—In December 1946 a man 42 years old accidentally drove his automobile into a tree and sustained numerous contusions, abrasions, lacerations of the head and neck, fracture of four ribs, Bennett's type of fracture of the right thumb and bilateral fracture of both acetabulums, with dislocation of the right hip and partial paralysis of the sciatic nerve (Fig. 4*a*).

On December 21, open reduction of the fractured thumb was performed, and the patient's legs were placed in skin traction. Four months later an attempt was made to reduce the dislocation of the left hip with the patient under the influence of anesthesia, after which the right leg was placed in traction for four weeks and the left leg for eight weeks. He was allowed to be up ten weeks after the accident, and began to walk at that time, but had considerable difficulty in doing so. Three and a half months after the accident the left hip became very painful, and he noticed a slipping sensation when he moved. He had noticed numbness of the medial aspect of the right foot and great toe, and had had no feeling in them since the accident. He came to the clinic for further advice.

On admission to the clinic in April 1947, or about four months after his accident, this patient was experiencing considerable pain in both hips, but this was more marked on the left. It had become increasingly difficult for him to get about, even with the aid of crutches. The patient's legs were equal in length, but both showed considerable muscular atrophy. The right leg was lying in internal rotation and adduction; the hip could be flexed to 90 degrees and abducted to 30 degrees; it could not be externally rotated or extended past 180 degrees. The left leg was lying in external rotation

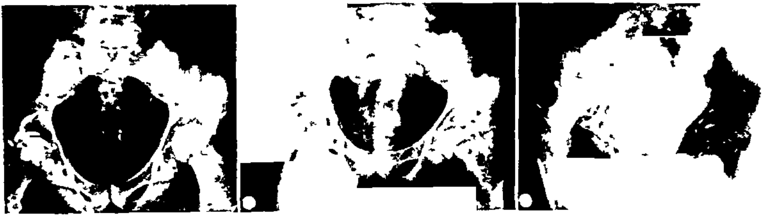


Fig 4—Bilaterally fractured acetabulums (*a*) with dislocations of femoral heads in case 5 fragments of fractured acetabulums appear displaced, *b*, roentgenogram made nine and a half months after injury, showing atrophy in head of right femur with narrowing of joint space, the left hip shows absorption and deformity of femoral head, greater trochanter is displaced upward and inward large bone fragment apparently in undergoing atrophy and becoming united bones of pelvis and femurs have undergone some atrophy and aseptic necrosis is occurring in both hips *c*, roentgenogram made two years after injury right femoral head has undergone aseptic necrotic changes sufficient to cause deformity and absorption and appears displaced farther in enlarged acetabulum with adduction deformity left hip shows further loss of joint interspace trochanter is slightly more upwardly displaced, large fractured fragment appears united all bones about hips appear less atrophic

and could not be internally rotated or flexed because of pain and muscular spasms. When forced flexion of 70 degrees and abduction of 30 degrees were obtained in the hip All superficial and deep reflexes were exaggerated, and there was loss of tactile sensation of the medial aspect of the right foot and great toe but no foot drop The diagnosis at this time was fracture of the right acetabulum fracture of the left acetabulum with upward and posterior dislocation of the fragment, Bennett's fracture of the right thumb fracture of ribs on the left and multiple lacerations of the head and face (Fig 4*b*)

This patient was examined again about two years after injury The aseptic necrosis of the hips was progressing and further post traumatic arthritic changes could be expected (Fig 4*c*) The patient managed to continue his work, surgical treatment was not given He was advised to return later for further consideration

Case 6—*Primary Sciatic Paralysis With Fracture of Posterior Rim of Right Acetabulum Displacement of the Fragment and Dislocation of Hip*

A man 52 years old fell asleep while driving his automobile on Aug 20 1947 He ran into a telephone pole in front of a hospital He received immediate attention for the fracture of the posterior rim of the right acetabulum, with upward displacement of the fragment, fracture dislocation of the head of the femur and primary right sciatic paralysis. With the patient under the influence of pentothal sodium anesthesia, the hip had been reduced and a Thomas splint with Pearson attachment had been applied When we saw him he had numbness and right foot drop, for which he required a brace Roentgenograms disclosed bone masses about the lateral and posterior surfaces of the right hip resulting from old fractured fragments with malunion The left hip appeared to be normal (April 13 1948) Spondylitis with lipping appeared in the lumbar part of the spinal column

Comment on Case 6—Although this patient came to us in April 1948 because of pain and stiffness of the right hip and along the sciatic nerve he admitted that he was improving and that he was able to walk much longer distances than before He was advised to continue with conservative measures and to report in about twelve months for reexamination and reconsideration of his condition (Fig 5) at which time he did not have the severe causalgic pains which he previously had, he performed at least 75 per cent of his duties and his morale was better than it had been He still had complete paralysis of the anterior tibial group of muscles and almost complete paralysis of the peroneal group but all other muscles were working well

Case 7—*Old Fracture Dislocation of Left Hip and Malunion of Fractured Acetabulum With Traumatic Sciatic Neuritis*—A man 50 years old was seen seven and a half months after injury in a head-on automobile collision on Nov 17, 1947 At the time of the accident the head of the left femur had been driven backward fracturing the acetabulum and producing dislocation. The patient did not know whether foot drop occurred instantly or developed later, four weeks after manipulation and traction he found that he was unable to move the foot upward and he also noticed numbness of the

Fig. 5.—Resulting bone masses formed about posterolateral borders of the right hip after fracture of acetabulum in case 6, with displaced bone fragments, after fracture dislocation.

foot, mostly about the great toe. He did not notice any sensory changes immediately after the accident.

At the time of examination at the Mayo Clinic, the patient walked with a left limp and had about 40 degrees of flexion deformity of the left hip. He did not complain of pain. Roentgenograms of the left hip showed displacement of the femoral head upward about 1 inch (2.5 cm.), with malunion of fragments of the acetabulum, sclerosis of the ilium, ischium and pubic bone which looked like the condition seen in Paget's disease, and spondylitis with lipping in the lumbar part of the spinal column. He continued to receive conservative treatment.

CASE 8.[*]—*Old Fracture of Left Acetabulum With Posterior Displacement of Femoral Head Complicated by Injury to Left Sciatic Nerve.*—On June 7, 1934 a lineman 31 years old, while on a 30-foot (9 M.) telephone pole, fell to the ground, landing on his left foot and left knee. He was immediately disabled but did not become unconscious. He was hospitalized immediately. Roentgenograms were made which, he was told, showed dislocation of the left elbow and an impacted fracture of the head of the left femur. With the patient under the influence of anesthesia the fractured elbow was reduced, and the fracture of the hip was treated conservatively. The patient came to the Mayo Clinic eight months later, using a crutch. He said that after his injury he had noted immediate inability to move the left foot, with numbness over the lateral aspect of the leg, foot and posterior aspect of the thigh. He added that there had been some diminution of the area of numbness. He had been unable to abduct the left thigh for some months, although during the two months just prior to his admission this condition had improved. After six weeks in the hospital, he had been permitted to return home by ambulance; he remained in bed there for four weeks. He had *pain in the left buttock* which was steady and dull, but not lancinating. Ten weeks from the time of the accident, he was able to be up with the aid of crutches. At this time his physician told him that the left sciatic nerve was injured; he received massage treatment. After further consultation, the making of roentgenograms and treatments were discontinued, and the patient was advised to seek further examination and opinion at the clinic.

Examination disclosed some degree of atrophy of the left thigh, and ½-inch (1.2 cm.) shortening of the left leg. Flexion and adduction of the hip appeared to be normal, but there was limitation of abduction and circumduction. A firm mass was palpable in the left buttock; this mass was attached to the fragment of bone which was pressing on the damaged sciatic nerve. Roentgenograms showed the fracture of the left acetabulum involving the posterior superior margin, the fragment being displaced upward.

There was paralysis of the left leg, with foot drop. This patient was seen in consultation by a neurologist, neuro-surgeon and orthopedic surgeon, who advised that the fragment of bone be removed because it was causing pressure on the sciatic nerve near the sciatic notch. Woltman[3] has illustrated by charts and photographs the progressive improvement of the sciatic and posterior cutaneous nerves after surgical removal of the fragment of bone in this case by one of us (Meyerding).

There was evidence of left traumatic sciatic palsy, with anesthesia of the entire left foot; also some limitation of motion in the elbow, an impaction fracture of the left sacroiliac joint, and spondylitis with lipping of vertebral bodies of the spinal column.

On March 8, 1935, through a gluteal muscle-splitting incision, the sciatic nerve was exposed and displaced. The fragment of the acetabulum was found to have been pushed upward under the sciatic nerve. The fragment of bone was removed and the sciatic nerve was dissected free. Transplantation of a pedicle flap of muscle underneath the nerve was performed. The sheath was not ruptured and the nerve did not appear to be severed.

Comparison of Figure 6*a* with 6*b* and 6*c*, representing the same patient and made two years and three months after removal of the fragment of bone, shows that there was marked improvement in the areas of sensory loss; furthermore, the muscles had recovered about half their power.

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[*] Roentgenograms not available in this case

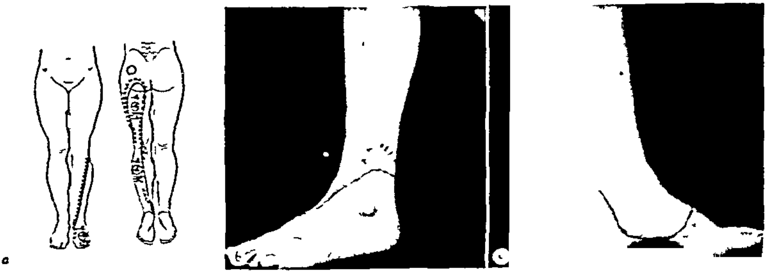

Fig 6.—Injury to left sciatic and posterior femoral cutaneous nerves (*a*) shown in diagrams drawn eight months after injury in case 8, there analgesia was noted below line of arrows and anesthesia below solid line circle on left buttock designates site of mass of scar tissue and fragment of bone which was pressing on sciatic nerve. this fragment was removed. Symbols on drawing and photographs have the following significance: Zero, normal; –4 or –IV, complete loss, arabic numerals not encircled, tactile sensation: arabic numerals encircled, pain sensation, roman numerals not encircled, temperature Lateral (*b*) and medial (*c*) photographs of left leg, showing lines bounding sensory loss two years and three months after removal of bone fragments. Status of motor as well as sensory nerves had improved.

In September 1943, eight years after injury, the patient was much improved and able to carry on without difficulty his daily work at a government ordnance plant, was driving 84 miles each day.

SUMMARY AND CONCLUSION

Modern transportation accidents cause an increasing number of fractures of the acetabulum, with dislocation of the femoral heads The sciatic nerve may be seriously damaged at the time of the accident or later. Careful examination before treatment is advisable in order to establish the cause and time of occurrence of paralysis When fracture dislocation has taken place with immediate evidence of paralysis the damaged hip should be reduced, fragments of bone replaced or excised, and the sciatic nerve explored Pressure or injuries to the sciatic nerve cause paralysis, which may be recognized as soon as the patient's condition permits thorough examination Prompt surgical treatment of serious primary sciatic paralysis complicating fracture of the acetabulums and dislocation of the femoral head is advisable. Secondary sciatic paralysis may result from treatment, hematoma, pressure of scar or callus

RÉSUMÉ

Le taux actuel des accidents de circulation cause un nombre de plus en plus élevé de fractures de l'acétabulum accompagné de luxation de la tête du fémur. Le nerf sciatique peut être sérieusement endommagé au moment de l'accident ou plus tard On conseille l'examen consciencieux avant d'entreprendre le traitement afin de déterminer la cause et le moment de début de la paralysie. Lorsque la fracture-luxation se produit avec symptômes immédiats de paralysie, la hanche luxée sera remise en place, les fragments osseux rétablis ou excisés et le sciatique examiné La paralysie peut être causée par des lésions ou par la pression sur le nerf, ce que l'on doit déterminer dès que l'état du malade permet un examen détaillé. L'auteur conseille l'intervention chirurgicale précoce de toute paralysie sciatique primaire sérieuse compliquant la fracture de l'acétabulum avec luxation de la tête du fémur. La paralysie secondaire peut être le résultat du traitement lui-même, de l'hématome, de la pression cicatricielle ou du cal osseux

RESUMEN

Los accidentes de transporte modernos causan un número creciente de fracturas del acetabulum con luxación de la cabeza del fémur. En el momento del accidente, o más tarde, puede lesionarse *gravemente* el *nervio* ciático. Es aconsejable practicar un examen cuidadoso antes del trata[illegible]to p[illegible] establecer las causas y mome[illegible] presentó la parálisis Cuando [illegible] luxa-

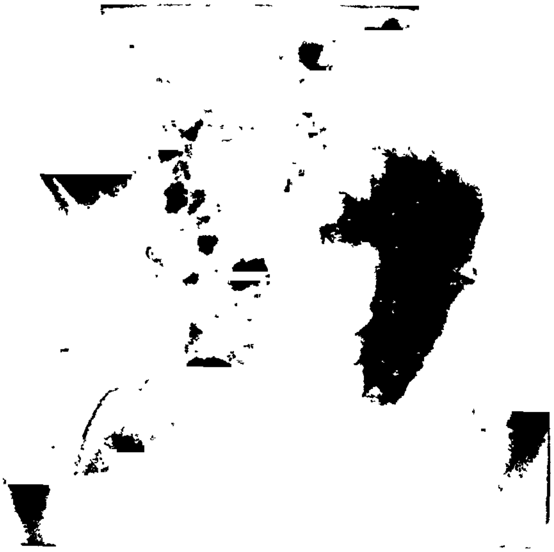

Fig. 5.—Resulting bone masses formed about posterolateral borders of the right hip after fracture of acetabulum in case 6, with displaced bone fragments, after fracture dislocation.

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At the time of examination at the Mayo Clinic, the patient walked with a left limp and had about 40 degrees of flexion deformity of the left hip. He did not complain of pain. Roentgenograms of the left hip showed displacement of the femoral head upward about 1 inch (2.5 cm.), with malunion of fragments of the acetabulum, sclerosis of the ilium, ischium and pubic bone which looked like the condition seen in Paget's disease, and spondylitis with lipping in the lumbar part of the spinal column. He continued to receive conservative treatment.

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Examination disclosed some degree of atrophy of the left thigh, and ½-inch (1.2 cm.) shortening of the left leg. Flexion and adduction of the hip appeared to be normal, but there was limitation of abduction and circumduction. A firm mass was palpable in the left buttock; this mass was attached to the fragment of bone which was pressing on the damaged sciatic nerve. Roentgenograms showed the fracture of the left acetabulum involving the posterior superior margin, the fragment being displaced upward.

There was paralysis of the left leg, with foot drop. This patient was seen in consultation by a neurologist, neuro-surgeon and orthopedic surgeon, who advised that the fragment of bone be removed because it was causing pressure on the sciatic nerve near the sciatic notch. Woltman[3] has illustrated by charts and photographs the progressive improvement of the sciatic and posterior cutaneous nerves after surgical removal of the fragment of bone in this case by one of us (Meyerding).

There was evidence of left traumatic sciatic palsy, with anesthesia of the entire left foot; also some limitation of motion in the elbow, an impaction fracture of the left sacroiliac joint, and spondylitis with lipping of vertebral bodies of the spinal column.

On March 8, 1935, through a gluteal muscle-splitting incision, the sciatic nerve was exposed and displaced. The fragment of the acetabulum was found to have been pushed upward under the sciatic nerve. The fragment of bone was removed and the sciatic nerve was dissected free. Transplantation of a pedicle flap of muscle underneath the nerve was performed. The sheath was not ruptured and the nerve did not appear to be severed.

Comparison of Figure 6*a* with 6*b* and 6*c*, representing the same patient and made two years and three months after removal of the fragment of bone, shows that there was marked improvement in the areas of sensory loss; furthermore, the muscles had recovered about half their power.

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[*] Roentgenograms not available in this case.

Local Causes of Mortality and Early Morbidity in Gastroduodenal Resection for Peptic Ulcer

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NEW YORK

WHILE there is no scarcity of papers evaluating the final results of gastroduodenal resection for peptic ulcer, very little, particularly in recent years, has been reported on the early mortality and morbidity associated with the operation.

On the other hand, the wide acceptance of vagotomy among surgeons cannot be explained by its superior results, because a follow-up of vagotomized patients does not justify the popularity of the operation. One is led to assume that the low mortality associated with vagotomy may be the main reason for this enthusiasm, since apparently gastroduodenal resection still has a considerable fatality rate.

References to mortality figures are often missing from the periodic reports of departments interested in the surgical treatment of peptic ulcer. To be sure, the value of any surgical procedure must be measured by its clinical results. However, silently passing over the immediate mortality connected with a method is far from giving a true picture of its results; moreover, an important incentive to technical improvement is missed if the question of operative mortality either is not discussed at all or is dismissed with the statement that problems of technic are unimportant. Indeed, there is no surgeon—experienced or otherwise—who will not benefit from an honest examination of the immediate results of his activity in intestinal resection.

Better understanding of preoperative, operative and postoperative care, advances in anesthesiology, and the use of antibiotics and anticoagulants have largely eliminated fatalities due to complications other than those occurring in the operative field. Today it is fair to assume that mortality following gastroduodenal resection is caused

1. By separation of the duodenal stump
2. By accidental lesions of the common duct and the pancreas
3. By obstruction of anastomoses
4. By postoperative hemorrhage

1. *Separation of the Duodenal Stump.*—If pylorus and duodenum are not involved in the inflammatory process, classic inversion of the duodenal stump is fully reliable, provided that the posterior wall is mobilized to an adequate extent to avoid undue tension of the inverting sutures.

However, separation of a well closed stump can be effected by back pressure of duodenal content. A prerequisite of increased duodenal pressure is obstruction of the afferent jejunal loop at the gastrojejunal anastomosis. In this case it is evident that permanent suction drainage of the stomach cannot prevent duodenal retention. In the postoperative course, signs and symptoms of duodenal distention are similar to those of acute cholecystitis. Absence of bile in the aspirated stomach content is an additional indication. If there are increasing signs of localized peritonitis, a second laparotomy becomes imperative, though no mention of this indication for revision is made in the ample literature on the surgical treatment of peptic ulcer. The particular procedure to be performed in these cases is needle aspiration of the duodenal content and enteroanastomosis, provided that the afferent loop is long enough to permit anastomosis. If "no loop" retrocolic anastomosis was done at the first operation, decompression of the duodenum can be effected by duodenojejunostomy. The anterior wall of the duodenum is connected with an upper jejunal loop by side to side anastomosis.

Duodenal obstruction may also follow an end to end anastomosis at the duodenojejunal junction as performed in the course of radical operation for marginal ulcer. The following case history illustrates this condition.

A 52 year old male patient was admitted to the hospital with the diagnosis of marginal ulcer. He had previously undergone a retrocolic "no loop" gastroenterostomy for duodenal ulcer and, two years later, an excision of the pylorus and part of the antrum because of the "unsatisfactory result" of the gastroenterostomy. At operation a large penetrating marginal ulcer was observed. The greater part of the remaining stomach and the jejunal loop was resected. Transection of the proximal partion of the jejunum was carried out at the duodenojejunal junction. The third part of the duodenum had to be mobilized according to Clairmont's technic in order to perform an end-to-end duodenojejunostomy. Although a one-layer suture was used, the diameter of the anastomosis was rather small. An end-to-side gastroenterostomy (Hofmeister-Polya type) was added.

The patient's pulse and temperature rose on the fifth postoperative day; he complained of sharp and spasmodic pains in the right upper quadrant of the abdomen, where rebound tenderness was present. As this tenderness increased in scope and intensity and no bile could be aspirated through the Levine tube, obstruction of the duodenojejunostomy was suspected. A second laparotomy showed the duodenal stump to be tremendously distended; there was a moderate amount of biliary exudate around it, though no separation could be demonstrated. About 500 cc. of duodenal content was removed by needle aspiration. The patient's poor condition did not permit an extensive procedure. The duodenum was incised and a catheter introduced. The immediate result was satisfactory. Temperature and pulse went back to normal. The daily amount of duodenal juice sucked off through the catheter left no doubt that the duodenal fistula was complete. In a short time the skin around the incision became excoriated because of the digestive property of pancreatic juice. Ten days later a third operation was performed: A jejunal loop was brought up retrocolically, an anstomosis with the duodenal opening effected, and a jejunojejunostomy added. Four weeks later, however, an incomplete intestinal obstruction made another laporotomy necessary. A loop of the lower part of the ileum was adherent and strangulated at the incision of the mesocolon. The loop was freed and an enteroanastomosis performed. The subsequent course was uneventful. The patient gained 15 pounds (6.8 Kg.) in a short time. He has been in perfect health for over a year.

Though separation of the duodenal stump because of back pressure is accompanied by prodromal symptoms of some days' duration, the clinical picture is, as a rule, more acute in cases in which inadequacies of suture technic or of the blood supply of the stump are responsible. This event manifests itself in much the same way that a ruptured duodenal ulcer does, and it is only logical to apply a similar treatment: namely, immediate laparotomy. From the time before present rules for handling the duodenal stump in cases of deep-seated duodenal ulcer were not yet established, I remember a number of cases in which immediate revision probably saved the patient's life. In fact, one of these cases gave the reason to modify the duodenal closure along the lines now used for about twenty years.[1c]

A middle-aged patient was operated upon for penetrating ulcer of the posterior wall of the duodenum. Gastroduodenal resection was performed. Although the ulcer crater (in the pancreas) was left in situ, the posterior wall of the duodenum distal to the ulcer was separated from the head of the pancreas in order to permit use of the classic method of inversion of the stump. The sutures uniting the anterior and posterior walls of the duodenum were not under undue tension. Thirty hours later, acute peritonitis developed in the upper part of the abdomen, and the diagnosis of separation of the duodenal stump was made. Immediate revision was decided upon. A large amount of biliary fluid was observed in the subphrenic space and around the duodenal stump. There was almost complete necrosis of the inverted posterior wall, with a dime-sized perforation in the center. A heavy rubber tube was introduced into the duodenal opening and epiploon wrapped around the tube. The postoperative course was satisfactory. There was a profuse flow of bile and pancreatic juice through the tube for about seven days. The tube was then removed; external duodenal drainage ceased on the fourteenth day.

The following conclusions can be drawn from this case and similar ones:

1. Separation of the duodenal stump should be treated in exactly the same way as any primary intestinal rupture— by immediate laparotomy.
2. In cases of penetrating ulcer the blood supply of the posterior wall of the duodenum is, to a larger than normal extent, taken over by highly vascularized adhesions between the capsule of the pancreas and the duodenum. In dissecting out the posterior wall these vessels have to be ligated, which invites the danger of partial necrosis.

Moreover, exposure of the posterior wall, though unnecessary, is a rather tedious and—in view of the proximity of the common duct and the pancreas—a hazardous procedure. It was for this reason that a modified duodenal closure was recommended (1932) which dispensed with mobilization of the posterior wall and used only the anterior wall for covering the stump [1a] Statistics give proof of the value of this method

Up to 1931, the postoperative mortality rate for gastroduodenal resection for duodenal ulcer was about 8 per cent.[1b] From 1932 to 1936 this rate (in a total of 259 cases) was 3 08 per cent [1c] From January, 1941 to January 24, 1950, the same statistic in 173 cases was 0 6 per cent

The first decrease in mortality must have have been brought about by the modified technic, the second was probably due to better anesthesia and the liberal use of blood transfusions and antibiotics

In the period from 1941 to 1950, which corresponds to the author's surgical practice in New York, no duodenal ulcer was encountered which could not be resected by the method described There were two penetrating ulcers of the second and third portion respectively, which at operation proved to be cancerous In both instances a history of duodenal ulcer of many years' duration was given In the first case (second portion) a Whipple type of resection was performed The patient had an uneventful recovery In the second case (third portion) the diagnosis of cancer was not definitely established during the operation An exclusion resection of the first part of the duodenum and three quarters of the stomach—was performed The patient returned one year later with evidence of diffuse peritoneal carcinomatosis, to which he succumbed

The only postoperative fatality was the death of a 45 year old woman with penetrating ulcer of the posterior wall of the duodenum On resection no difficulties were encountered The patient died on the ninth postoperative day from thrombosis of the superior mesenteric and portal veins, for which no mechanical cause could be found

It may be mentioned that the oldest patient was 87 years of age Involvement of the pylorus in a mass of tumorlike appearance suggested carcinoma, though subsequent histologic examination revealed ulcer with considerable collateral edema She made a perfect recovery.

The combination of duodenal ulcer with prepyloric carcinoma occurred in a patient with an ulcer history of thirty years' duration

In another case the first part of the duodenum was transformed into a narrow and rigid pipe owing to ulceration of the posterior wall and scar formation of the anterior one This was the only case in which Finsterer's exclusion resection might have been considered. I felt, however, that the existing stenosis would hamper drainage of the remaining prepyloric pouch. Since the anterior wall was not pliable enough for inversion, the first jejunal loop was anastomized side-to end to the duodenal stump, as described some years ago [1c]

2 *Accidental Lesions of Pancreas and Common Duct*—Injuries of pancreatic parenchyma are unpredictable in their consequences They may heal without any complications, they may lead to effusion of pancreatic juice with subsequent peritonitis, they may be followed by acute pancreatitis It is therefore the wisest policy to avoid incision of pancreatic tissue if possible In resection the ulcer crater in the pancreas should be left untouched after the gastric or duodenal wall has been separated from the brim of the crater Leaving the crater in situ is a fairly good protection against complications unless an eroded accessory pancreatic duct is present in the depth of the ulcer This can be recognized by effusion of pancreatic juice and proved by probing of the duct Then the technic of closure requires a modification, in order to prevent accumulation of pancreatic juice between the two suture lines, which may lead to arrosion and separation Adequate drainage can be procured by leaving out the first row of sutures; thus drainage into the duodenum is assured [1c]

Injuries of the common duct can be safely prevented in ulcers of the posterior wall by our method of closure If the penetration involves also the hepatoduodenal ligament, excision of the ulcer crater will endanger the common duct It is here likewise the best tactic to leave the crater intact Exposure of the common duct and introduction of a T-tube, as recommended by Lahey, will serve the purpose of protecting the duct, although in the last series of 173 cases I never found it necessary to apply this protective measure

External drainage of the operative field has been a matter of routine in cases in which an ulcer crater was left in situ or in which pancreatic parenchyma was exposed Although in the reported series no pancreatic biliary or duodenal drainage was encountered, I was impressed by the large amount of serosanguineous fluid expelled through the drain in the first postoperative days Since 1933 practically every gastroduodenal resection wound has been drained; it was the same consideration that induced Wangensteen, as he reported in a recent paper, to favor postoperative drainage.[2]

3. *Obstruction of the Anastomosis.*—Wangensteen[2] has drawn attention to the fact that obstruction is much more frequent at the corner points of the anastomosis than at its center. His technic assures adequate patency at the critical spot. There are, however, cases of obstruction in which mechanical conditions seem to be satisfactory if checked after termination of the anastomosis. This happens much more frequently in patients on whom the resection was performed for peptic ulcer rather than for malignant disease. As a tendency to intestinal spasm is one of the outstanding features of the ulcer diathesis, one gains the impression that obstructive symptoms in the beginning are caused by a combination of spastic and mechanical factors, the latter becoming more and more prevalent in an advanced stage of the condition.

In the early stages, large doses of atropine may be helpful. While it is possible to overcome the nutritional difficulties by parenteral feeding for a long period, a repeated laparotomy should not be delayed when after six or seven days no signs of patency of the anastomosis are evident. Leaving the Levine tube in situ for more than one week may lead to decubital ulcers of the esophagus and—particularly in elderly patients—to bronchopneumonic complications. Since the point of obstruction as a rule is at the junction of the gastric stoma and the efferent jejunal loop, an additional gastroenterostomy is the procedure of choice. Not much is gained by inspecting the original gastroenterostomy or by trying to correct the mechanical conditions in this area. We prefer to enter the upper part of the abdomen through a separate left pararectal incision; the efferent jejunal loop is grasped and, in using a long afferent loop, a new anastomosis with the anterior wall of the stomach is performed. A short circuiting jejunojejunostomy between the afferent and the efferent loop is added.

4. *Postoperative Hemorrhage.*—The two main reasons for intrinsic hemorrhage subsequent to gastric resection are: (1) transected vessels at the anastomosis, and (2) hemorrhagic gastritis.

In the latter case the loss of blood seldom reaches dangerous proportions. Moreover, this cause of postoperative hemorrhage is extremely rare and cannot be determined with certainty. It is the best policy to assume that persistent and rapid postoperative hemorrhage is due to one or several bleeding vessels at the anastomosis, and to act accordingly. This does not mean operative hemostasis in every case. In the majority of cases continuous blood transfusion will carry the patient over the critical time until spontaneous closure of the bleeding vessel has taken place.

There is, however, an occasional case in which spontaneous hemostasis fails to occur. A repeated laparotomy becomes imperative. The least time-consuming procedure is the best. Undoing of the anastomosis would necessitate its restoration after hemostasis has been effected. This takes considerable time. The operation can be shortened considerably by doing the necessary work through a gastrotomy: An adequate incision is made in the anterior wall of the stomach parallel and to a distance of 1 inch (2.5 cm.) to the anastomosis. Then the surgeon's left hand pushes the anastomotic ring into the gastrotomy incision; bleeding vessels are clamped from within and ligated.

If only diffuse oozing is encountered, a continuous stitch of atraumatic chromic catgut will accomplish the necessary hemostasis. The anastomosis is then permitted to slip back, and the gastrotomy opening is closed in two layers.

To be sure, this unpleasant complication can be fairly well prevented by careful hemostasis during the resection. As routine, we use von Haberer's suture ligatures of the submucosa of the stomach and make sure that spouting vessels of the submucosa of the jejunum are properly ligated. Since these precautions were adopted only one massive postoperative hemorrhage has been encountered.

SUMMARY AND CONCLUSIONS

Local complications following gastroduodenal resection for peptic ulcer are discussed with regard to prevention as well as treatment.

Indications for early repetition of laparotomy are outlined

The article is submitted as a contribution to a chapter on operative surgery, which is so ably presented in M Thorek's book "Surgical Errors and Safeguards"

RESUME

Les complications locales suivant la résection gastroduodénale pour l'ulcère peptique sont discutées du point de vue de la prévention aussi bien que du traitement L'auteur présente un sommaire des signes qui exigent la laparotomie précoce

Cet article est présenté comme contribution à un chapitre sur la chirurgie opératoire admirablement mise au point dans le livre de Max Thorek intitulé "Erreurs et Précautions Chirurgicales" ("Surgical Errors and Safeguards)

RIASSUNTO

Discute le complicazioni locali successive a resezione gastro duodenale per ulcera peptica delineando sia i mezzi per prevenirle, sia i metodi di cura Espone le indicazioni per una precoce ripetizione della laparatomia

L'articolo e' dedicato ad un capitolo della chirurgia operativa che e' cosi abilmente trattata da M Thorek nel suo libro "Surgical Errors and Safeguards '

RESUMEN

Se estudian las complicaciones locales que se presentan a continuación de la resección gastroduodenal para tratar una ulcera péptica en cuanto a su prevención y su tratamiento esbozandose las indicaciones de la repeticion precoz de una laparotomía

El artículo se presenta como una contribución a un capítulo de la cirugía operatoria que tan competentemente ha sido expuesta en el libro del Dr M Thorek titulado "Surgical Errors and Safeguards"

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The Good Old Days

Lavoisier, under sentence of death by the French Revolutionary Tribunal on the grounds that 'la Republique n'a pas besoin de savants" ("The Republic has no need of scientists") was still so much more interested in science than in his own fate that he begged for postponement of the execution that he might see the results of experiments in hand This favor, of course, was denied him "It took but an instant to cut off his head" said one of his friends to another "but a hundred years will not produce one like it"

Sir James Mackenzie, of whom it was said that he mended men's hearts faster than Cupid could break them, was denied existence itself by his jealous contemporaries A group of German doctors once made pilgrimage to see and honor him, on asking direction from a group of famous heart specialists in London they were told flatly, 'There is no such person"

Intravenous Sodium Dehydrocholate in Treatment of Hepatic Duct Stones

Report of a Case and Review of the Literature

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GALLSTONES remaining or forming in the bile ducts are a relatively common cause of unsatisfactory results following operations on the biliary tract. In 1938, Best and Hicken[1] reported a nonoperative method of removing such calculi. These workers concluded that the increased flow of a thin, watery bile resulting from administration of hydrocholeretics would produce an irrigating effect on the biliary duct system. Best has since reported further excellent studies on the control of bile flow and the successful washing out of remaining calculi.[2]

The case herein reported is one of erroneous operative diagnosis of carcinoma of the ampulla of Vater, followed eight years later by cholecystectomy and choledocholithotomy. Cholangiographic studies after the second operation revealed stones in the hepatic duct. Removal of these stones was facilitated by biliary flush with intravenous sodium dehydrocholate.

Best has used a three-day flush with oral dehydrocholic acid and antispasmodics. Atropine and nitroglycerine are used to relax the sphincter of Oddi. Our studies[3] and the studies of Ivy and his associates[4] show that intravenous administration produces a more profound stimulation of bile flow than does oral administration. The main problem in our case was moving the hepatic duct stones out of the liver. We therefore decided to use a combination of oral dehydrocholic acid and intravenous sodium dehydrocholate, in order to produce the greatest possible increase in flow of thin, watery bile. Antispasmodics were not used, for there was no spasm of the sphincter of Oddi and the stones were not lodged in this location. In addition, the patient experienced no colic during the period when five small stones passed into the duodenum.

From a review of the literature and from our own clinical studies, we agree with Best that bile acids will produce a biliary flush. There has been no previous case reported of the successful use of hydrocholeretics in the removal of hepatic stones. We have been unable to find a previous report on the use of intravenous sodium dehydrocholate in the removal of stones from the biliary and hepatic ducts.

REPORT OF CASE

A 46-year-old Negress was admitted to the Cook County Hospital in February 1941 because of jaundice of three months' duration. The patient stated that she had had frequent episodes of nausea and flatulence during the preceding four months. She had noted no abdominal colic but had some dull, inconstant epigastric discomfort. She had lost 25 pounds (11.3 Kg.) in weight during this period. Her jaundice was gradually progressive in development and was nonremitting; dark urine and clay-colored stools were of constant occurrence. Physical examination at this time revealed a deeply jaundiced patient with a non-tender, firm liver margin palpable 3 cm. below the right costal margin in the midclavicular line. Examinations of the urine repeatedly gave negative results for urobilinogen and strongly positive results for bile. The stools at all times were acholic. Occult blood was present in several stool specimens. Fifteen days after admission an exploratory laparotomy

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was performed The surgical report of this procedure states that the liver, pancreas, and common duct appeared normal The gallbladder was dilated but otherwise normal in appearance and was filled with thick, green bile A diagnosis of carcinoma of the ampulla of Vater was made, and a cholecystogastrostomy was performed A liver biopsy specimen at this time revealed minimal biliary cirrhosis The patient's postoperative course was uncomplicated, and she was discharged three weeks after the operation

After her discharge from the hospital, she remained free from jaundice but had frequent episodes of nausea and flatulence There was a definite intolerance to fatty foods, the eating of which resulted in attacks of pain in the right upper abdominal quadrant, which at times were accompanied by emesis When she remained on a bland diet, she was asymptomatic No icterus was noted by the patient during this period

In January 1949 the patient had several attacks of severe colic in the right upper quadrant, with chills, fever, and emesis After the third of these attacks she noted a faint yellow color in her sclera and, several days later, generalized icterus The icterus was constant, the urine dark and the stool clay colored at all times There was a 10 pound (4 5 Kg) loss of weight in three weeks, due to dietary restriction During this period, the patient was not seen by a physician until July 1949, when she was admitted to a medical service at the Cook County Hospital and later transferred to our surgical service

Physical examination on July 30 revealed a well developed, colored female in no acute distress but showing evidence of recent loss of weight Temperature, pulse, and respirations were normal The blood pressure was 140 systolic and 80 diastolic Generalized, marked icterus was present, and a firm, non tender liver margin was palpable 1 5 cm below the right costal margin in the midclavicular line Initial laboratory studies disclosed the following a hemoglobin value of 66 per cent The blood count revealed 3 790,000 red cells (many of which were macrocytic and hypochromic) and 7,200 white cells per cubic millimeter, with a normal differential count The Kahn test and a scout film of the abdomen revealed no abnormality Chemical studies of the blood are shown in the accompanying table The urine was free of albumin and sugar, and microscopic examinations gave negative results The values for nonprotein nitrogen and for creatinine were within normal limits Repeated examinations of urine specimens over a ten day period revealed positive results for bile, but no urobilinogen could be observed even after precipitation of the bile with calcium chloride The stools appeared acholic at all times and contained no occult blood

Clinically, jaundice was a persistent observation On August 6 a double lumened tube with a distal weighted balloon was passed into the stomach and duodenum (This tube is so constructed that the proximal end aspirates the stomach while the distal end is located near the ligament of Treitz, thus it is possible to collect duodenal contents uncontaminated by gastric juice) Aspiration for three hours failed to reveal the presence of bile in the gastric secretions which contained free acid Secretions obtained from the duodenum were much less in volume than the average value that we have obtained with normal persons[3] These specimens were bile stained and microscopic study revealed numerous pus cells A secretin test showed normal volume and bicarbonate responses indicating normal pancreatic function After this procedure it was concluded that the cholecystogastrostomy performed in 1941 was occluded and that there was an incomplete obstruction of the common bile duct with cholangitis

The patient was prepared for operation with thiamine niacin vitamin K, a high protein and high carbohydrate diet, and penicillin Further

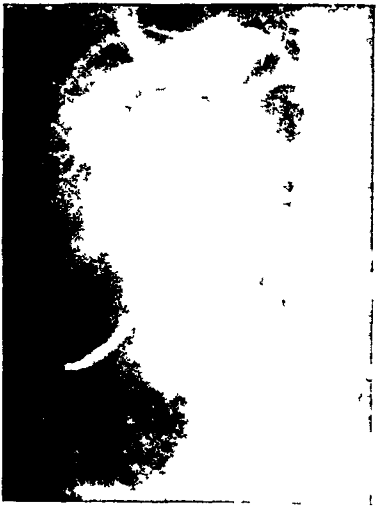

Fig 1 —Postoperative cholangiogram Large stone in left hepatic duct, five small stones in branch of right hepatic duct

Chemical Hematologic Data in Case Reported

	Total protein, Gm./100 cc.	Albumin, Gm./100 cc.	Globulin, Gm./100 cc.	Total cholesterol, mg./100 cc.	Alkaline phosphatase, units	Icteric index, units	Thymol turbidity, units	Gamma turbidity, units
July 30	7.4	3.5	3.9	350	24.0	61	11.6	14.2
August 3	8.4	4.4	4.0		30.5	31	18.4	16.1
August 8	Second Operation							
August 22	8.4	3.8	4.6	238		65	16.3	11.5
August 30	8.0				10.4	12	12.0	14.4
September 7	7 3	3.6	3.7		8.4	38	9.0	11.2
September 16	7.2	4.0	3.2		7.3	18	6.3	11.3
October 11	8 0			307	17	11	11.2	12.2
November 2	8 4	4.1	4.3	315	19.5	6	13.2	10.1
November 21	Third Operation							
November 21	7 8	3 7	4.1	261			14.2	10.2
November 28	7 9	3 9	4 0	186	11.1	8	8.4	8.9

The cephalin flocculation reaction was negative in all specimens.

laboratory studies were done on August 7 (see table). The following day an exploratory laparotomy was performed, revealing a nonfunctioning cholecystogastrostomy, chronic cholecystitis, cholelithiasis and choledocholithiasis. The cholecystogastrostomy was taken down and the stomach closed. Choledochostomy revealed 20 to 25 small pigmented stones. After careful probing and scooping of the common and hepatic ducts, a T-tube was placed into the common duct. A cholecystectomy was performed and Morrison's pouch drained. The patient was taken to the recovery ward in good condition.

The immediate postoperative course was uneventful. However, a routine cholangiogram on August 18 revealed that the common and main hepatic ducts were somewhat dilated. A large, polyhedral, radiolucent stone was seen in the left main hepatic duct, and there were mutiple smaller radiolucent stones within a branch of the right hepatic duct. The common duct was free of stones, and the dye entered the duodenum in a normal manner (Fig. 1).

It was felt that the large stone within the left main hepatic duct was so located as to make surgical removal very difficult, if not impossible. At the time of operation the hepatic ducts were probed with great care, and this stone was not palpated. As is shown in the cholangiogram (Fig. 1), the stone was located high in the duct and at such an angle that it could not be scooped out; therefore, it was decided to attempt biliary flush with the objective of flushing the smaller stones into the duodenum and the larger stone into the duodenum or at least into the common duct, where surgical removal would be greatly facilitated. Studies of the blood were done on August 22 (see table). Treatment was begun on August 25, and the following routine was used: The patient received 0.5 Gm. of dehydrocholic acid orally three times a day; every morning and evening 10 cc. of 20 per cent sodium dehydrocholate (Decholin sodium) were administered intravenously. Prior to this the drainage from the T-tube had been thick and cloudy, containing a great deal of debris. Institution of this therapy resulted in a great increase in the volume of drainage and in a thin, golden yellow, clear bile.

This routine was continued daily, and on August 29 another cholangiogram was taken. The large stone remained in the left hepatic duct. However, the right hepatic duct and its branches appeared free of stones, and several small radiolucent areas were seen in the common duct. (Fig. 2). These

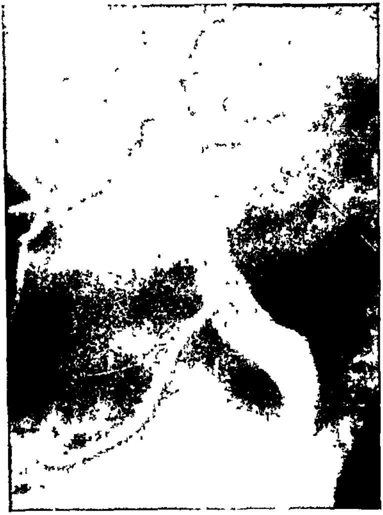

Fig 2 —Large stone in left hepatic duct, small stones in common duct

were interpreted as representing several of the small stones which had previously been present in the right hepatic duct

Intravenous injections of sodium dehydrocholate were continued every other day, and cholangiographic studies on September 17 and October 2 showed the same large radiolucent area in the left main hepatic duct The right hepatic duct and the common duct were free of stones It was therefore concluded that the smaller stones had been flushed into the duodenum

During the aforementioned period, chemical studies of the blood were carried out on three occasions, August 30, September 7 and September 16 (see table) The urine after the seventh postoperative day was free of bile and showed greater than normal amounts of urobilinogen. The stools were brown

Intermittent intravenous administration of sodium dehydrocholate was continued, and on October 11 a cholangiogram showed the large radiolucency located at the proximal end of the common duct just above the T-tube (Fig. 3). On October 26 a repeat cholangiogram showed that the large calculus had moved 2 cm. distally within the common duct alongside the T-tube (Fig. 4). The same cholangiographic picture was present on November 15

During this entire period the patient was perfectly comfortable No adverse affects were noted at any time after the administration of sodium dehydrocholate However, chemical studies of blood drawn on October 11 and November 2 revealed that the levels of alkaline phosphatase, total cholesterol, and thymol turbidity were slowly rising

Owing to failure to flush the large stone farther down the common duct, and because of the slowly rising alkaline phosphatase, total cholesterol, and thymol turbidity determinations, it was decided that surgical intervention was indicated for removal of the large stone, which had passed from high in the left hepatic duct to an easily accessible site in the common duct adjacent to the T-tube The patient was prepared for operation The results of blood studies recorded on the day of operation are shown in the table In addition, the laboratory reported a prothrombin activity of 98 per cent, the hemoglobin value was 77 per cent The red cell count was 4,200,000 per cubic millimeter of blood and the white cell count 7,600 The differential count was normal. During the preceding ten days urine studies revealed traces of bile, and urobilinogen determinations ranged between a trace and 1 plus

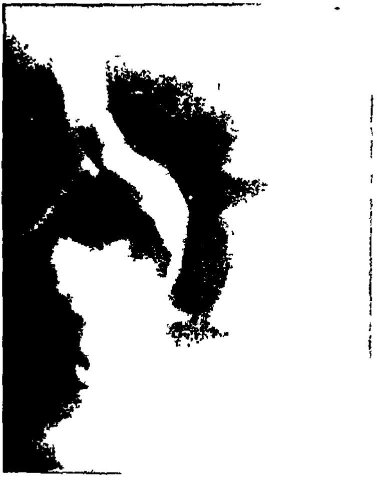

Fig 3 —Large stone in common hepatic duct.

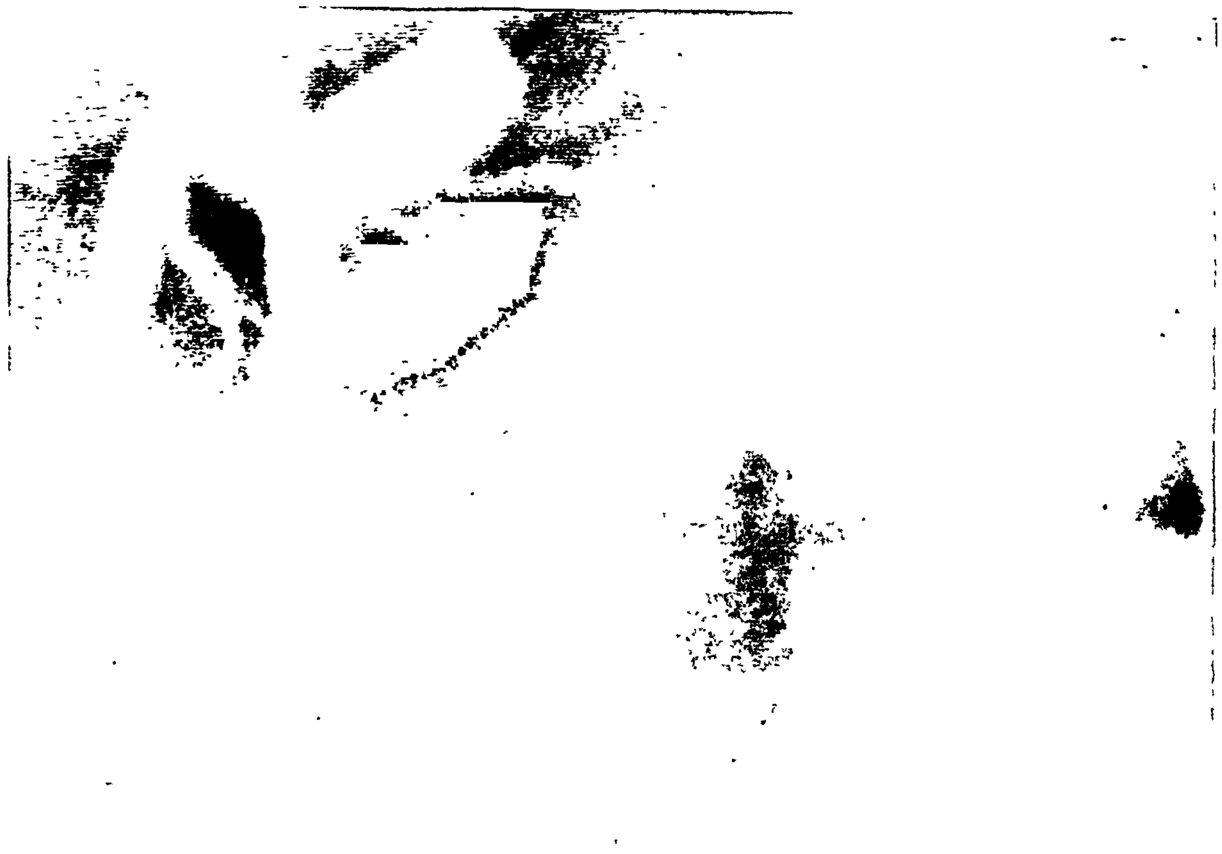

Fig. 4.—Large stone impacted against T-tube in the common duct.

On November 21 a large stone was removed from the common duct with comparative ease, and a T-tube was replaced in the common bile duct. The patient returned to the recovery ward in good condition.

The postoperative course was uncomplicated. The urine gradually lightened in color; after the seventh postoperative day, bile was absent and traces of urobilinogen were present in the urine. The stools were brown at all times. A liver biopsy specimen taken at the time of operation showed chronic perilymphangitis. On November 28 further blood chemistry studies were performed (see table).

Cholangiographic films taken on December 6 and repeated on December 13 revealed the hepatic ducts, their branches, and the common duct to be free of stones. The dye entered the duodenum in a normal manner (Fig. 5). The patient was discharged on December 15 with the T-tube in place, but clamped. She had no complaints.

COMMENT

The erroneous diagnosis made at the time of the laparotomy in 1941 might have been avoided by careful examination of the ampullary area; the diagnosis should not have been made merely by exclusion. In view of subsequent observations, the original disturbance was probably due to impacted calculi.

Calculi high in the hepatic ducts are a serious problem because of their inaccessibility. Reports by Best[5] of the presence of hepatolithiasis in 7 per cent of a series of cases of cholelithiasis and by Weiss[6] of an incidence of hepatic stones in 8.3 per cent of autopsy performed in cases of gallbladder disease emphasize the relative frequency of this condition. In the case here reported, multiple small hepatic duct stones were completely flushed out of the biliary duct system. The larger stone in the left hepatic duct was flushed into the common duct, where it was easily accessible for surgical removal. Further damage to the liver by biliary blockage or cholangitis was thereby prevented.

As Best has emphasized, the stimulation of thin bile, with the resulting accelerated flow and increased intraductal pressure, is needed to bring about a flushing effect on the biliary duct system. The remarkable hydrocholeretic properties of sodium dehydrocholate make this the desired agent.*

Sodium dehydrocholate is a hydrocholeretic, as opposed to whole ox bile, which is a choleretic. The latter produces an increase in the flow of bile, but the resulting bile is of high viscosity. A hydrocholeretic produces an increase of thin bile. Sodium dehydrocholate produces a marked increase in the output of bile with an increased water content and a decreased amount of total solids per cubic centimeter of bile. This bile is 20 to 25 per cent less viscous than the bile of untreated patients.[2c]

Studies on animals with oral sodium dehydrocholate conducted by Ivy,[7] Berman and his associates[8] and other workers,[9] show that dehydrocholic acid produces a greater increase in the volume output of bile than does any other agent tested. Clinically, these results have been confirmed in studies involving T-tube patients.[10]

Even more striking are the results obtained when sodium dehydrocholate is used intravenously. Grodins, Berman and Ivy[4] noted an increase in bile volume output of 365 per cent over a one-hour period when 20 mg. per kilogram of body weight was given intravenously to dogs Our clinical studies[3] with duodenal intubation show that patients with stones of the common duct have an increased volume output of at least 100 per cent over a one-hour period in response to 10 cc. of 20 per cent sodium dehydrocholate (Decholin Sodium) intravenously. The peak of this response occurs, on the average, fifteen minutes after injection, and an increased flow of bile is noted at least fifty minutes after injection.

An increased pressure behind a ductal obstruction is important in biliary flushes. Studies[11] with T-tube patients have shown an increased pressure when dehydrocholic acid is administered. An increase in intraductal pressure was obtained, which was 25 to 50 mm. of water greater when the drug was given intravenously than when it was given orally.[12f]

The patient in the case under discussion received sodium dehydrocholate intravenously over a long period without any perceptible toxic effects. Decholin Sodium is a chemically pure bile acid which is the least toxic of all bile acids and bile salts. This fact has been confirmed by the studies of numerous workers.[12]

The long-continued use of intravenous sodium dehydrocholate has been studied by Berman and his co-workers,[8] who found that no change in body weight or alteration of hepatic or renal function resulted in dogs receiving 10 to 20 times the human therapeutic dose daily for three to seven months

Ivy[7] has prepared a series of dogs with ligation of the common bile duct. One-half of the group were given daily intravenous injections of dehydrocholic acid and the other half used as controls. No significant difference was noted in the survival time of the two groups.

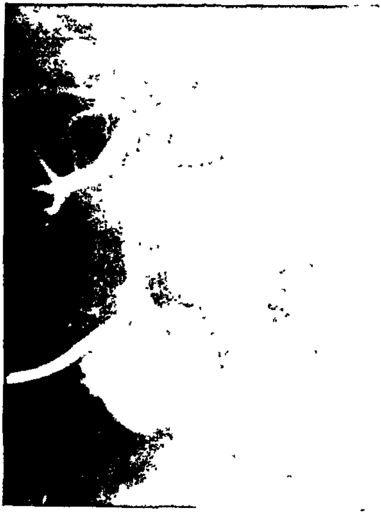

Fig. 5.—Bile ducts free of stones after the third operation.

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* [illegible] ugated cholic acid [illegible] idation product of [illegible] portant of the bile [illegible] e 3, 7, 12 positions [illegible] olanic acid. Oxida- [illegible] xyl groups to keto [illegible] triketocholanic acid [illegible] ocholate is the salt [illegible] cent aqueous solution as Decholin Sodium by the Ames Company who generously provided the material used in this study.

SUMMARY

A case is presented which demonstrates that intravenous administration of sodium dehydrocholate is an effective means of irrigating and washing out the biliary duct system. Small intrahepatic duct stones were completely *flushed out of the hepatic and common* bile ducts, and a larger intrahepatic duct stone was flushed into the common bile duct, where surgical removal was greatly facilitated.

RÉSUMÉ

Présentation d'un cas démontrant que l'administration intraveineuse de sodium déhydrocholate est un moyen effectif pour l'irrigation et le lavage du système de canaux biliaires. De petits calculs du canal intrahépatique furent ainsi chassés des canaux hépatiques et cholédoques et un calcul plus important du canal intrahépatique fut poussé dans le canal cholédoque commun d'où son prélèvement fut par là grandement facilité.

RESUMEN

Se presenta un caso que demuestra que la administración intravenosa de dehidrocolato *sódico es un medio eficaz de irrigar y lavar los* conductos biliares. Pudieron asi eliminarse totalmente de los conductos hepático y colédoco pequeños cálculos intrahepáticos proyectándose por irrigación un cálculo intrahepático en el conducto biliar, lo que facilitó notablemente su extirpación quirúrgica.

RIASSUNTO

Presenta un caso che dimostra la possibilita' di eliminare mediante iniezioni endovenose di deidrocolato di sodio piccoli calcoli intraepatici. In questo caso piccoli calcoli situati nei dotti intraepatici sono stati spazzati fuori dei dotti epatici e del dotto comune: un calcolo piu' voluminoso e' stato eliminato dai dotti intraepatici nel dotto comune, da cui e' stato facilmente asportato mediante l'operazione.

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Safe Surgery of Gallbladder and Bile Ducts

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ON THE subject of surgical treatment of the bile ducts much has been written and said. No operation taxes the surgeon's ability more. The vitallium tube has been heralded and discarded, as have many other expedients. Today one school brings the jejunum to the bile duct, another with amazing skill dissects the stump of the bile duct from the pancreas and by mobilizing the duodenum, approximates it to the upper ductal vestige literally wheedled from the liver, and to crown all portions of the liver are resected to obtain enough of a duct to implant into the jejunum.

These operations are a remarkable tribute to surgical dexterity, but they are all immensely difficult. As was aptly remarked at a recent symposium on the subject, patients requiring bile duct repair should be directed to a hospital where the necessary skill has been developed, but this too is difficult and sometimes impossible. To watch Arthur Allen, Cattel, Lahey or Waltman Walters solve the apparently insoluble problem of the damaged bile duct reveals the essence of fine surgery, but to achieve this superlative skill requires continuous practice. In the smaller countries of the world such practice is not available, and some other solution must be sought. At the Johannesburg General Hospital we strive to attain this end not by instructing our surgical trainees in the performance of these heroic procedures, but by impressing on them the wisdom of doing only what they can do with safety to the patient, and not being afraid to do rather less than they have set out to do if this is in the patient's best interest.

BASIS OF THIS STUDY

The material used in this study is taken from two sources. It includes data on the gallbladder from the Johannesburg General Hospital from 1945 to 1949 and from one surgeon's records in private practice from 1940 to 1949. The accompanying table is a summary of these data.

Operations on the Gallbladder

	No. of cases	Common duct explored	Deaths	Returned for bile duct repair
Johannesburg General Hospital	369	77 (20.9%)	15 (4%)	4 (1.1%)
Private patients	259	56 (21.6%)	6 (2.3%)	0

It is noticeable that in the hospital figures the operative mortality was 4 per cent. Among private patients it was about half that. In the hospital series the common bile duct was injured in at least 4 cases—about once in each 100 cholecystectomies. In the private series there was no case of injury to bile ducts. It is in the hospital that the surgeon gets his training. Does this mean that the trainee must gain his experience by causing unnecessary deaths and injuring the common bile duct? The answer should assuredly be "no." During the period in review I saw 4 private patients with injured ducts, none of whom had been operated on in the Johannesburg General Hospital. The impression is gained that the vast majority of injuries to the common duct are not treated in the great hospitals but in the smaller towns where surgeons have not the advantage of precept and example. It has been truly said that surgery of the bile passages is the most difficult type of surgery, and for the inadequately trained doctor to undertake it is a crime against the individual and the State. A "surgical conscience" is an essential part of the surgeon's armamentarium. Without it the surgeon is poorly equipped indeed.

There is unfortunately no way of supplying the deficit. It is regrettable that in most countries the doctor, on obtaining his qualifying degree, is legally entitled to practice the whole

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Grateful acknowledgment is made to my registrar Mr. Joseph Lannon F.R.C.S. (Eng.) and to Drs. Brakin and Katz my house surgeons for assembling the data from the hospital records.

range of medicine and surgery. In the Union of South Africa it has recently become law that no doctor may go into private practice until he has completed one year of internship. This safeguard at least prevents the tyro from putting up his plate before he has obtained a modicum of experience. It has been urged in responsible quarters that the practice of surgery be permitted only to those who satisfy certain stringent criteria, but hitherto the step has been found impracticable. There is little doubt that such restrictive measures will ultimately be introduced. The training given in certain of the United States to enable candidates in surgery to pass the State Board examinations is the ideal to be aimed at.

GENERAL CONSIDERATIONS

Before operating on the bile passages the trainee surgeon should know certain fundamentals:

1. *Adequate Exposure.*—(*a*) In the hyposthenic typ of patient with a lor narrow
chest the i ion should be paran n, dis-
placing the s laterally. *It mus the*
costal marg In the sthenic ty h a
wide upper , a transverse in e-
sents the a e that one or ti
may be divi out damaging t
supply. The incision of Koch
cellent. It pr disadvantages
any pathologic ther than the e
one is found, be enlarged
serious injury inal wall.
the transverse n al incison
be extended bey border
rectus muscle. T cision i
ined by the pos er. If
is enlarged or n p
will make the

wledge of
or variabil
overnin
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e
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3.
patio
creas.
a stone

to find it. Palpation should therefore be gentle, and stones should be "milked" distally. Palpation of the head of the pancreas should be deliberate and thorough. Twice I have seen a yellow, diseased gallbladder removed after cursory examination of the pancreas, only to reveal in 1 case that a carcinoma of the pancreas was present after that valuable ally, the gallbladder, had been removed. This is poor surgery. The bile duct should be dealt with first, and the gallbladder removed only when its uselessness has been established. In the second case, continuing jaundice led to reexploration four months after the first operation, and this disclosed a well advanced pancreatic carcinoma which had been missed at the first operation.

Maingot[1] puts the incidence of stones of the common duct in calculous cholecystitis at 25 per cent. Ninety per cent of stones of the common duct originate in the gallbladder.

When should the bile duct be explored? 1. When it is dilated. 2. When it contains stones. 3. When there has definitely been jaundice. 4. When the gallbladder contains stones. 5. When in doubt.

The decision is an important one. Allen[2] has
estimated the tality rate of simple chole-
cystectomy at per cent. When cholecystec-
tomy is comb ith exploration of the bile
duct, it is 4. cent. When the duct does
not contain exploration does not in-
crease the ri
Palpation not sufficient to exclude
ne in th ahey stated that at his
ic the ing explored more and
often ative results in a third of
ases. onal series of cases here
as explored in 21.6 per
ults in 14 per cent.
duct, two stay sutures of
l through the duct wall
between them in its long
istance as is compatible
manipulations; in any
ot greater than the diam-

IN GENERAL

l or contains stones or
d with a T tube. This
le before the abdomen

is closed If the duct is not pathologic it is closed as advised by Reinhoff[3]

The patency of the sphincter of Oddi is determined by the use of a flexible lead probe and de Baikie's graduated dilators The normal orifice admits a 3 mm probe If the orifice is constricted it is dilated to 7 mm Arthur Allen moves to the patient's left when dealing with the sphincter This suits a right handed surgeon, who can manipulate the dilators with his right hand while holding the second part of the duodenum to control the end of the dilator with his left hand

The two main reasons why the common duct is injured are

1 Pulling on the gallbladder, tenting the common duct, and clamping the common duct instead of the cystic duct This is most likely to happen in the "easy" case It arises from failure to display the anatomic structures and should not occur

2 The haphazard application of artery forceps when sudden severe hemorrhage obscures the field Many years ago, while acting as house surgeon to Sir David Wilkie, I saw him in just such a case control bleeding with his left forefinger in the foramen of Winslow (epiploicum) and his thumb on the front of the structures in the right free border of the gastrohepatic omentum The bleeder was easily picked up and tied in the resulting dry field This is now standard practice

Thus, further rules emerge

1 Deal with the pathologic condition in the bile duct before attacking the gallbladder

2 Remember that the existence of a pathologic gallbladder does not exclude cancer of the head of the pancreas

Should the procedure begin medially or laterally? Arthur Allen of Boston has advised that it should begin laterally, i e from the fundus This is a more tedious procedure than the other, as the blood supply is secured only at the end of the mobilization There can be no question about the soundness of this advice

(*a*) There is no cystic vein and venous blood enters the liver through short veins that can be exposed and ligated in the fundus first type removal

(*b*) The anatomic operative field can be more deliberately and readily exposed If one uses the mobilized gallbladder as a handle the duct system can be visualized, particularly above the entry of the cystic duct, where the hepatic arteries also lie

(*c*) Should a reason be disclosed for not removing the bladder, its duct and artery are intact at the end of the mobilization procedure, and the viscous can be reattached without injury This is a theoretical rather than a practical point

DETAILS OF TECHNIC

There are two assistants one opposite the surgeon and one on his left

The swabs are placed and retracted—one below, which holds down the colon and duodenum, one in a medial position, which holds the falciform ligament and the stomach medially, and one above which retracts the liver

The injection of physiologic solution of sodium chloride beneath the peritoneal coat of the gallbladder is useful, as a generous plane of cleavage is formed

The serosa over the gallbladder is cut with a knife ¼ inch (0 6 cm) from the liver and the viscus separated from its bed the vessels being deliberately secured as they are exposed

The liver, when adherent is separated by blunt dissection from the gallbladder and not vice versa The gloved finger is frequently used to advantage in mobilizing the deeper part of the organ There is often a fair amount of oozing which stops when the cystic artery is secured

In difficult operations the main trouble arises between the common hepatic duct and the proximal part of the gallbladder and cystic duct In this area there normally exist strong fibrous attachments These are much more dense after repeated attacks of inflammation Here lie hepatic ducts the common and the right hepatic, and cystic arteries The surgeon may expose the common bile duct readily enough, but there may be inextricable adhesions above the region where the cystic duct or the infundibulum of the gallbladder approximates the main ducts It is apparent, therefore that the most vulnerable structure is not the common bile duct but the common hepatic or the right hepatic duct

When this state of affairs obtains, the stage is set for injuring important structures Division of the serosa transverse to the gallbladder axis approximately 1 inch (2 5 cm) lateral to the line of the main ducts will sometimes allow the dissection to proceed medially beneath the resulting serosal flap Sometimes, however, there is no plane of cleavage It is then often advisable to cut away the distal part of the gallbladder and grasp the cut edge of the remaining portion in forceps at several places along the circumference. This enables the surgeon to see the amount of gallbladder that remains, and it may then be possible to dissect this from its surroundings.

The situation and direction of the cystic duct may now be determined with a probe. If there are stones in the cystic duct, they can be extracted or removed after one has cut down carefully on a probe in the duct. Should it still be considered unsafe to divide the gallbladder from the duct system, one proceeds as follows: destroy the remaining mucous membrane of the gallbladder by diathermy and tie a transfixion ligature across the stump. Should diathermy not be available, just transfix and tie.

It is far better to leave the cystic duct and even a small part of the gallbladder than to be heroic when the anatomic picture is unknown. The patient with a divided common hepatic artery will die. The patient who sustains damage to one of the great bile ducts may survive, but he is doomed to a very few years of misery and suffering despite all the surgeon can do. The gallbladder may reform from a stump, but this event is a surgical curiosity and in any event a subsequent removal, if necessary, will be attended with less hazard. The bile does not clot; therefore the divided cystic duct heals by approximation to contiguous structures. It is then necessary to reconstitute the right border of the gastrohepatic omentum, thus burying the stump. The suture is continued and the gallbladder bed closed by suturing the peritoneal edges prepared for this purpose.

The hepatorenal pouch (Morrison's pouch) should be drained—an absolute rule. A ligature may slip or be pushed off by straining. Accessory bile ducts may have been divided and escaped recognition. Bile peritonitis is always fatal. A drain deals with all these contigencies. Here, as elsewhere in surgery, never drain through the main wound but through a stab. Even though a T tube has been inserted, it will not drain the hepatorenal pouch. A Penrose drain should be placed in the pouch.

COMMENT

The most important aspect of surgery of the biliary passages is the need of constant vigilance. Canny Ryall once said that advances in surgery lie not in the development of more aggressive procedures but in the replacement of major by minor ones. For many years cholecystectomy was the procedure of choice for the gallbladder cases, and a very successful one it was. The surgeon should never hesitate to use it if the well-being of the patient so demands. If he doubts his ability to remove the gallbladder safely, he should drain it. Our young doctors are rightly taught never to be ashamed to say "I don't know." Our young surgeons should similarly be taught that they must not hesitate to do rather less than was intended if the patient's life and well-being are thus assured. Perhaps this is the hardest lesson of all to learn, but if it were learned the damaged duct would be a curiosity rather than a common observation.

The ten commandments for the young surgeon operating on the gallbladder are:

1. Obtain adequate exposure.
2. Know the anatomic picture.
3. *Employ retrograde removal.*
4. Divide no structure until the anatomic structure of the part is adequately displayed.
5. Deal with the bile duct before attacking the gallbladder.
6. Remember that a pathologic gallbladder does not exclude cancer of the pancreas.
7. If removal of the entire gallbladder is unsafe, drain it.
8. If removal of a part of the gallbladder is unsafe, leave it behind.
9. Drain in every case.
10. An unfinished operation "re infecta" is better than a dead patient.

I can do no better than quote verbatim a message from that Colossus of surgery, Frank Lahey,[1] to the Southern Surgical Association of America:

"This is so trite that I blush every time I say it, but we ought to concentrate on giving more attention to publicizing how dangerous cholecystectomy is. We realize that cholecystostomy has been almost abolished, but thousands of cholecystectomies are being done every day and each one is a possible stricture. If the patient died instead of recovering after injury to his ducts, in many cases he would be better off than to live with what he has to go through in the way of expense and suffering. We should publicize the fact that cholecystectomy is a dangerous operation. It is dangerous unless one realizes how important it is to control the blood supply, to demonstrate definitely the anatomic relationship and to realize that anomalous anatomy is very common. I believe we could do nothing better than to write more and more on the need for accuracy in cholecystectomy.

SUMMARY

The author outlines certain basic principles of surgery with special reference to operations on the gallbladder and bile ducts. This is a "teaching article" designed to help orient the younger surgeon in his work.

RESUME

L'auteur esquisse certains principes fondamentaux de chirurgie, s'interessant particulierement aux operations sur la vésicule biliaire et sur les canaux choledoques. Voici un article d'interêt educatif s'adressant au jeune chirurgien au debut de sa carriere.

RESUMEN

El autor expone ciertos principios basicos de cirugía con especial referencia a la intervención sobre la vesícula biliar y conductos biliares. Este artículo ha sido escrito con un propósito didactico para orientar al joven cirujano en su trabajo.

RIASSUNTO

L'articolo ha un carattere didattico designato ad orientare meglio il giovane chirurgo nel suo iniziato. Comprende alcuni principi chirurgici fondamentali specialmente per quanto riguarda le operazioni sopra la cistifellia e di dotti biliari.

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Every step of progress the world has made has been from scaffold to scaffold and from stake to stake.—*Phillips*

The law of life: Man is not man as yet.—*Browning*

Progress is the stride of God.—*Hugo*

Many persons might have attained to wisdom had they not assumed that they already possessed it.—*Seneca*

Aqueous Solution of Phenol as a Substitute for Alcohol in Sympathetic Block

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IT WOULD be worth while to study the further possibilities of therapeutic block of the sympathetic nerves, which has such a wide field of application in modern medicine. Trends toward future development of the method in general are moving in two directions:

1. *To secure the proper site for injection.*—This is hazardous in the presence of the many anatomic anomalies, and because of the smallness of the structures concerned in a deep body region. To meet these difficulties the following methods have been tried:

(*a*) Roentgen control (White and Gentry): These authors believe that this simple method of checking the position of the needles roentgenoscopically is a distinct aid toward accuracy of paravertebral injection for chemical destruction of the cardiac sensory pathways in cases of angina pectoris. I tried the method described and found it annoying for patients with advanced stenocardiac conditions.

(*b*) The use, in sympathetic block, of an apparatus devised by Philippides, following the idea of Kirschner, which described such an apparatus for the injection in the gasserian ganglion. This apparatus seems to me of no help in the case of irregularities of the sympathetic ganglions.

(*c*) "Endothoracic sympathectomy," which, after establishing a pneumothorax, permits destruction of the sympathetic structures under vision of a thoracoscope. The method was first used by Hughes and Goetz and further developed by Kux. For "poor risks" with angina pectoris this is a major operation, while easy cases in general, judging by my experience, do not reach the surgeon's office.

2. *To modify the drug injected into the sympathetic nerves for securing a lasting effect of block without dangers and complications.*—This is an especially urgent requirement for patients with angina pectoris. Even if treatment by sympathetic block with novocain, introduced by myself in 1925, gives satisfactory results in more than 50 per cent of the cases regardless of different etiologic factors, I feel that the shortcoming of the method consists in the more or less transitory action of novocain or procaine.

The first step to improve the result was taken in 1926 by Swetlow and later by I. C. White, by introducing alcohol instead of novocain for chemical interruption. The results of White with alcohol sympathetic block have been much more satisfactory than with novocain; he achieved 80 per cent good results. But another complication and unpleasantness appeared: alcohol neuritis of the intercostal nerves, which White explained as follows: "The sympathetic ganglia lie so close to the intercostal nerves that alcohol infiltration around the chain cannot help bathing their trunks. They are paralyzed at first, but anesthesia begins to disappear in their anterior divisions within a fortnight.

"Within a month the intercostal nerves are recovering along their entire length, and with this, there is a greater or lesser degree of hyperesthesia of the chest wall which commonly persists for a number of months. . . . In most cases the discomfort is quite bearable and clears up in a month or two. In others, about 10 per cent, it is more troublesome."

There is no question that alcohol neuritis constitutes a serious objection to treatment by alcohol block. In my own experience this complication occurred in about 10 per cent of cases. A large number of patients suffering from alcohol neuritis after block was reported by Levy and Moore. Of their 45 patients, neuritis occurred in 38, and in 3 instances it was described as severe. Perlow reported a mild degree of alcohol neuritis in approximately 20 per cent of his cases.

Flothow observed neuritis frequently, and Patterson and Stainski rejected the method altogether for that reason. The same stand was taken by de Takats. Cases of neuritis lasting "until death" were reported by Ransohoff and Grant, Saland and Klein and many others who dislike alcohol block for this reason.

It is to be understood that some surgeons abandoned chemical interruption of the sympathetic fibers altogether and looked for other operative methods, old or new, which result undoubtedly in a higher mortality than does sympathetic block. To this group belong, among others, Lindgren and Olivecrona: "The most important objection, however, is the alcohol neuritis which follows and which is apparently a very disturbing feature in many cases."

The prophylaxis of alcohol neuritis, used for years in my own cases and in most of them successful, could not change the aforementioned objections for a method which is satisfactory *per se.*

Quite naturally, therefore, an agent has been eagerly sought which would have greater efficacy than has novocain, without the side effects of alcohol.

After studying the effect of novocain and the sympathetic ganglions, Mandl and Rabinovici for various reasons made similar experiments with aqueous phenol solution. Phenol has long been used in physiologic experiments to destroy the sympathetic nerves (Asher and Pearce). It was introduced into clinical practice by Doppler, who used it in 5 to 7 per cent solution for chemical destruction of vascular sympathetic elements. After painting the spermatic or ovarian artery he noted increased blood flow to the genital organs and increased hormone production.

I performed the following experiments: In cats under general anesthesia the cervical ganglion was exposed and 0.2 cc. of a 6 per cent phenol solution was injected into the ganglion (see Mandl). The Horner syndrome appeared much earlier than after novocain injection (after fifteen minutes, on an average). It was intense, and enophthalmus was particularly distinct. It persisted for fourteen days on average (with novocain it had been five days!). Macroscopic and microscopic results were recorded after twenty-four hours, three, seven, thirty, forty-five and seventy-five days respectively. Complete necrosis of the nervous elements appeared with greater intensity than after injection of novocain. Only the connective tissue remained. The blood vessels of the perineurium were engorged. Staining with toluidin blue produced only a pale blue area. The pink color was almost entirely absent. Only in the peripheral zones were a few remnants of nervous elements still visible. After forty-five days destruction was still complete, with no sign of regeneration. After seventy-five days regeneration took place.

In comparison with the pathologic picture after the same experiment performed with novocain, it can be said that the effect of phenol is more powerful than that of novocain, as is evidenced by the earlier appearance and longer persistence of the Horner sign and also by the greater intensity of the destructive process from the start

Further experimental studies were performed, and injections of the phenol solution in skin, muscles, fascia and pleura microscopically studied. They revealed that the injection of 6 per cent aqueous solution of phenol involves no danger of necrosis in these tissues.

These experiments were performed in 1945 and at that time had not been applied in practice.

In spite of the aversion to identify morphologic changes in sympathetic structures and interruption of their function, it seems that in that case exists a kind of parallel between the grade of destruction of sympathetic fibers on the one hand, and lasting clinical effect on the other.

The most effective drug for chemical sympathectomy is alcohol, which destruction in the sympathetic ganglions and the rami communicantes was shown in microscopic pictures by Merrick. The least effective drug is novocain or procain, either of which produces relatively short degeneration of the sympathetic ganglion (Mandl and Rabinovici, 1947). The drug most similar to alcohol seems to be aqueous solution of phenol after our experience with the microscopic pictures and after observation of the clinical results (to be mentioned later).

The first clinical application of aqueous solution of phenol for chemical sympathectomy was published by Haxton in 1949. He used the method in 220 cases of vascular disorders of the extremities. In his opinion, interruption of sympathetic activity can persist for at least two years The procedure may be repeated if necessary. The complications encountered after the paravertebral injection of alcohol have not occurred with phenol. Of course, Haxton emphasizes, the method should be employed only by those who have large experience with the blocking of the sympathetic chain.

After Haxton, the Neurovascular Unit of the Manchester Royal Infirmary employed the new treatment. Boyd, Ratcliff, Jepson and James used injections of 10 per cent aqueous solution of phenol. After novocain is injected in the sympathetic chain as a test measure (with the usual consequences), 10 to 15 cc. of 10 per cent phenol solution is injected into the right place. Vascular diseases of the peripheral vessels has been treated and the authors conclude: "Chemical sympathectomy with 10 per cent phenol has a definite though limited place. The method has been used in patients over the age of 60 years and in those in whom lumbar ganglionectomy was contraindicated by reason of their general condition."

I tried sympathetic chemical interruption with aqueous solution of phenol (6 per cent) after the technic described by the Manchester group. I have been eager to block the thoracic ganglions, in order to compare the results with those of alcohol interruption. I have treated in a tentative way only 15 cases. In 3 cases of angina pectoris the ganglion stellatum has been injected and the first four to five thoracic ganglions too. In 5 cases of thromboembolic conditions of the brain, the ganglia stellata have been infiltrated with the phenol solution. In 6 cases of "intermittent claudication" the lumbar sympathetic chain has been injected. In 1 case of arterial embolism of the femoral artery the phenol block improved the condition immediately and did not require to be repeated.

No complication, no postoperative pain, no swelling and no signs of neuritis appeared. In the first group of cases the Horner sign appeared suddenly after the interruption and lasted always more than three days, which does not happen after interruption with novocain.

The immediate results have been satisfactory, and I hope in the course of time to obtain proof that chemical sympathectomy with phenol solution has a more lasting effect than has blocking with novocain, but without the complications of blocking with alcohol.

SUMMARY

Further development of chemical sympathectomy is suggested. Interruption of the sympathetic structures with aqueous solution of phenol (6 to 10 per cent) is recommended on the basis of experimental studies and clinical experiences. The indication of surgical sympathectomy is not discussed.

RÉSUMÉ

L'auteur demande que l'on approfondisse l'étude de la sympathectomie chimique. L'interruption de l'action de l'appareil sympathique au moyen de la solution aqueuse de phénol (de 6 a 10 pour cent) est recommandée en se basant sur les recherches expérimentales et sur l'expérience clinique. Les indications relatives au choix des cas ne sont pas présentées.

RESUMEN

Se recomienda como un nuevo adelanto en la práctica de la simpatectomía clínica la interrupción de las vías nerviosas simpáticas mediante una solución acuosa de fenol (6 a 10 por ciento), basándose en estudios experimentales y experiencias clínicas.

RIASSUNTO

Raccomanda ulteriodi indagini sopra la simpatectomia chimica. Consiglia—in base a ricerche sperimentali ed osservazioni cliniche —l'interuzione del simpatico con soluzioni acquose di fenolo (6-10%). Le indicazioni della simpatectomia chirurgica non vengono invece discusse.

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Intramedullary Nailing of Intertrochanteric and Subtrochanteric Fractures with Curved Nail

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OPERATIVE treatment of intertrochanteric and subtrochanteric fractures of the femur is justified only if the final results of an open procedure are clearly superior to those of conservative treatment To be sure, there would be little reason to replace the effective treatment of extension and immobilization by open reduction if it were not for early weight bearing and activity However the accepted methods of open reduction can do no more than shorten the period of immobilization if massive nails screws or steel plates are applied and involve operative risks and possible infection These risks can be avoided by using less extensive procedures but this usually involved the sacrifice of early stability for the sake of surgically achieved good position Therefore like most compromise solutions, the less extensive procedures are unsatisfactory

Open reduction can be considered superior if the procedure (1) allows early weight bearing (eight to ten days after the operation), (2) is so simple that it entails no greater risk to the patient than does conservative treatment and (3) is applicable in all cases of trochanteric fracture including compound fracture

In my opinion all these requirements are fulfilled by the use of a curved intramedullary nail of the Kuentscher type driven from the medial cortex of the femur through the upper third then through the fractured trochanter into the femoral neck and head

The nail has about the form of a quarter circle according to a description by my assistant Dr Herzer Stability of the fragments depends largely upon the points of support to which the nail is anchored in the marrow cavity (Fig 1) These are

1 The medial cortex, directly above the nail's entrance into the shaft,
2 The lateral cortex 5 to 7 cm above the nail's entrance,
3 The upper and lower cortex of the neck

All these places of support are, in my opinion, located in healthy and weight resistant bone

By applying Kuentscher's principle of intramedullary nailing I have been able to transmit the body weight from the femoral head via the nail to healthy femur Since the thigh bone is more or less straight, the curved nail is securely supported by the corticalis and does not slide out

The shape of the nail serves a twofold purpose (1) it maintains the angle of the femoral neck and (2) it securely wedges the lower end of the nail into the femur

The anatomical characteristics of the femoral medullar cavity facilitate the introduction of this nail A slightly protruding ledge on the inside of the mesial cortex is formed by the architecture of the femoral neck The nail inserted into the bone at the lower margin of this ledge (10 to 12 cm below the lesser trochanter) uses it so to speak, as a rail along which it slides upward, through the previously reduced fracture into the neck and head

The shape of the nail need not vary, because the medullar cavity allows sufficient shape for adjustment and the angle between the femoral neck and the shaft lies between 120 and 130 degrees, therefore a nail curved to an angle of 125 degrees can be used in all instances But the size of the nail differs with the individual case, depending upon the width of the medullary cavity Too thick a nail may be wedged into the cortex Roentgenograms help to determine the size suited to a medullary cavity of a given width Commonly the nails have a diameter of 9 to 10 mm (Fig 2) The length of the nail depends upon the measurements of the upper part of the femur to the planned entrance [illegible] nail, which should be chosen as far d[illegible] the fracture as possible,

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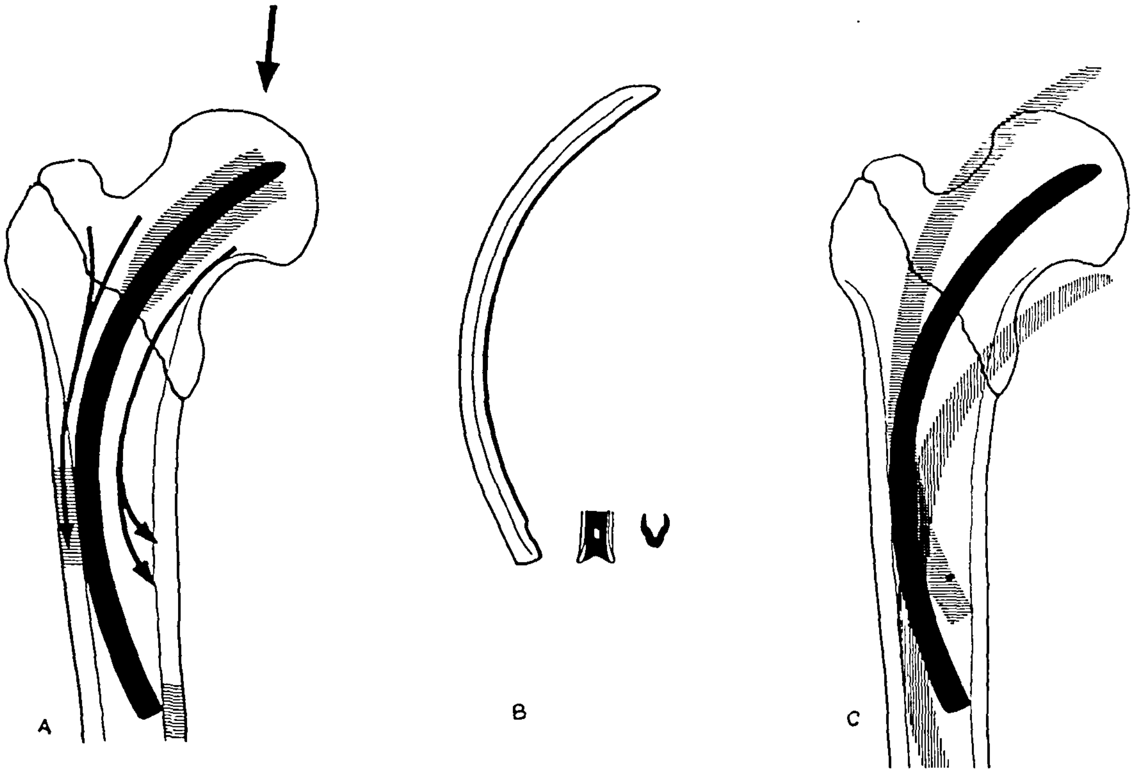

Fig. 1.—*A*, points of support to which nail is anchored into cavity (see text). *B*, sketch showing curve of nail and simplicity of construction. *C*, nail *in situ*. Shaded areas represent danger of perforation of cortex if nail is improperly introduced (see text).

on the medial aspect of the femur. The length of the nail varies between 15 and 17 cm.

The nailing itself is technically simple and is done without special instruments.

TECHNIC

For the first five to eight days the patient is treated conservatively to overcome shock and to stabilize the circulatory system. Skeletal traction is applied to either the upper part of the tibia, or the lower part of the thigh bone. Under traction of 3 to 5 Kg., with the extremity internally rotated, the fracture usually sets itself within a week.

For the operation the patient is placed on an extension table, the following preparations having been made:

1. The roentgen control pictures in two planes must show the fracture well set. (Only pictures on which the femoral head, neck, trochanter and upper third of the femur are visible provide sufficient proof.) Perfect reduction is a prerequisite to a successful procedure.

2. The curve, length and width of the nail are determined with the help of roentgenograms taken after reduction.

3. The point of nailing is marked at the medial edge of the femur. This is most important, because any change upward or downward changes the course of the nail, which then might perforate the cortex of the neck and come out either above or below the femoral head (Fig. 3).

For exact placing of the trepan hole through which the nail is driven, compasses are used, of a radius that corresponds with the length of the nail's secant. After one leg of the compass has been placed on the femoral head, the other then projects the length of the nail's secant on the thigh bone. By this procedure the line of incision, as well as the point of entry of the nail, is determined.

The operation is done with either spinal or gas anesthesia. The patient is placed on the table with both legs abducted (distance of heels re.-li. 70 to 80 cm.). The fractured leg is held in maximal internal rotation; the surgeon stands between the legs of the patient.

A cutaneous incision 5 to 8 cm. long is made over the medial aspect of the thigh at the point previously determined by the compasses, and the femur is exposed for about 5 cm between the retracted abductors. Before the medullary cavity is opened with the trepan, rechecking of the point for drilling the hole is advisable The trepan opening should be made large If the nail does not glide in easily, it becomes wedged into the corticalis and breaks it. Distal to the drill hole the cortex is flattened by a gouge, so that the nail can be started more easily and can be held in the proper direction, which is the horizontal plane If the nail deviates from the horizontal it is apt to miss the femoral head

The nail is driven home with strong hammer blows. After its convexity passes the inner surface of the lateral cortex, the nail encounters less bony resistance and glides quickly upward through the fractured parts When it reaches the neck one can feel renewed bony resistance. At this stage of the operation, the position of the nail is checked by roentgenogram; if it is satisfactory the procedure is terminated by a few more hammer blows

If the position of the nail is faulty, it is retracted and introduced anew, with the necessary change of direction The reason for a faulty position of the nail is due mostly to inaccurate measurements or errors in technic.

With the nailing completed, a last roentgen control film is taken before the suturing of muscle and skin terminates the operation. The skeletal extension is removed; the leg is held in slightly abducted position between sandbags After the wound has healed, active exercise of the leg may begin. The patient may get up and start walking as soon as he is able to lift his leg. It is surprising to observe how secure patients feel when taking their first steps after this procedure

SUMMARY

The indication for operative treatment of intertrochanteric and subtrochanteric fracture has been, in my opinion, enlarged by a procedure that assures stability of the fractured part and consequently its immediate weight-bearing capacity. Also, this treatment endangers the patient less than does a long rest in bed, which is required for conservative treatment. The application of this technic, there-

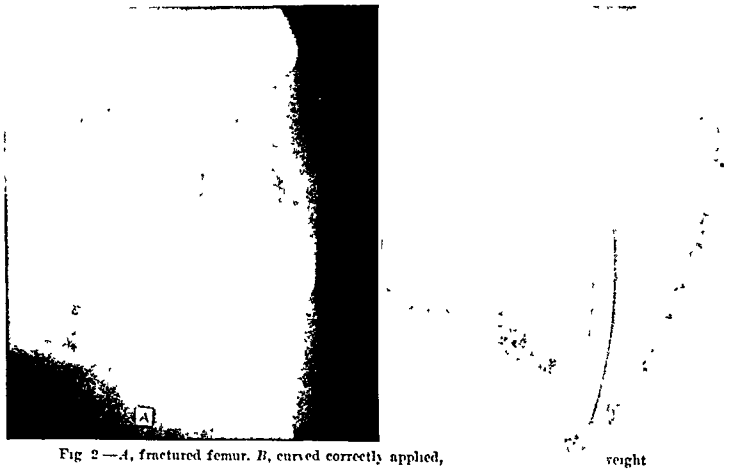

Fig 2 —*A*, fractured femur. *B*, curved correctly applied, [illegible] weight

fore, is justified in cases of simple trochanteric fracture of the first and second degrees, as well as in cases of the most severe trochanteric fractures, for which it was originally designed. Since its development, the prognosis for all trochanteric fractures seems greatly improved (Fig. 2, *A* and *B*).

Thus far, 22 patients between the ages of 67 and 86 years with trochanteric fractures (first to fourth degree) have been so treated. All could leave the bed after a healing period of ten days; all could move and bear weight on the leg securely and without pain. The postoperative period was shortened and simplified.

RÉSUMÉ

Les indications pour le traitement chirurgical des fractures intertrochantérienne et sous-trochantériennes ont reçu un champ plus large, je crois, de par un procédé qui assure la stabilité du membre lésé et, par conséquence, sa possibilité de supporter immédiatement le poids du corps.

Ce traitement a aussi l'avantage d'épargner au malade les dangers d'un long séjour au lit, exigé par le traitement conservateur; Cette technique se justifie donc dans les cas de simple fracture trochantérienne du premier ou deuxième degré, pour laquelle il a été conçu. Le pronostic de toutes fractures trochantériennes a été grandement amélioré dès son application. L'expérience démontre que le principe théorique qui nous a conduit à nous servir du clou incurvé était bien fondé (Fig. 4 et 5).

Jusqu'à présent, 22 malades, de 67 à 86 ans, atteints de fractures trochantériennes (du premier au quatrième degré) ont été traités ainsi. Ils ont tous quitté leur lit après une période de cicatrisation de 10 jours, tous pouvaient se mouvoir et s'appuyer sur le membre lésé avec assurance et sans douleur. La période post-opératoire fut écourtée et simplifiée.

RESUMEN

A juicio del autor las indicaciones para el tratamiento operatorio de la fractura intertrocantérica y subtrocantérica han aumentado gracias a un método que asegura la estabilidad de la parte fracturada, y en consecuencia su inmediata capacidad para soportar el peso del cuerpo.

Por añadidura, este tratamiento es menos peligroso para el paciente que un reposo prolongado en cama, medida requerida en los tratamientos más conservadores. La aplicación de esta técnica, por lo tanto, está justificada en los casos de fractura simple del trocánter de primero y segundo grado, así como en los casos de fracturas más graves del trocánter, para la que se ideó originalmente. Desde su desarrollo parece haber mejorado notablemente el pronóstico de todas las fracturas del trocánter. La experiencia práctica ha demostrado que el principio teórico en que se basa el autor para emplear un clavo incurvado es técnicamente correcto. (Fig. 4 y 5.)

Hasta la fecha, 22 pacientes de edades comprendidas entre 67 y 86 años con fracturas del trocánter del primero al cuarto grado se han tratado por este método. Todos ellos pudieron levantarse al terminar un período de curación de 10 días. Todos pudieron también moverse y soportar su peso sobre la pierna de un modo seguro y sin dolor. El período postoperatorio se acortó y simplificó.

RIASSUNTO

Le indicazioni per la cura chirurgica delle fratture intertrocanteriche e subtrocanteriche si sono—nell'opinione dell'A.—notevolmente estese in base ad un procedimento che assicura la stabilita' dell'osso fratturato e consente un'immadiata capacita' di sostegno, eliminando i pericoli di una prolungata degenza a letto, richiesta dalla cura conservativa. Il metodo descritto dall 'A. puo' essere applicato tanto alle fratture trocanteriche semplici, di primo e secondo grado, quanto alle fratture trocanteriche piu' gravi, per le quali era stato originalmente ideato. La prognosi per tutte le fratture trocanteriche e' notevolmente migliorata: l'esperienza clinica ha dimostrato che il principio teorico che aveva consigliato l'uso di un chiodo ricurvo (fig. 4-5) era giusto.

L'A. ha operato con questo metodo 22 pazienti, da 67 a 86 anni, colpiti da ogni varieta' di fratture trocanteriche (dal 1°-al 4°-grado). Tutti quanti hanno lasciato il letto gia' dopo 10 giorni: tutti quanti potevano muoversi bene: la gamba colpita reggeva senza dolori il peso del corpo. Il decorso postoperatorio e' stato notevolmente semplificato e ridotto.

Management of Acute Diseases of the Abdomen

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MATURITY of judgment and experiences of the past decade have tempered the concept of urgency surrounding acute diseases of the abdomen Haste hurry and emergency night operations are rapidly losing their pride of place

For years surgeons have been famed more for their skill than for their judgment, the focus has been on technical procedure speed dexterity and nerve When these were combined with egotism and above all with fluency the mixture fulfilled the requirements for international acclaim frequently upon an unstable foundation The purely anatomic adventure of surgery is receding in importance a modern surgeon is measured not so much by what he can do as by how much he knows about what he does

The changing educational concepts by which surgery has become standardized have laid heavy emphasis upon basic training and physiology and have brought about a recession in importance of the purely technical venture Urgency does not carry the same implications as it once did Emphasis is upon the patient as a whole rather than upon his diseased part and frequently now the urgency is for restitution rather than for surgical intervention In the old days preoperative preparation was unheard of—time was a wasting' The hallowed halls of medical learning reverberated to the dogma of Lawson Tait "When in doubt drain if still in doubt multiply the drains' The idea that the patient himself as well as his abdomen might urgently require restitution was suffering from an international dystocia'

Slowly with the mounting experience of thoughtful men questions of propriety began to be asked Was all this haste necessary' Could not many urgent operations be divided into multiple stages to lighten the burden on the patient' The great era of exteriorization had begun With it came the Ochsner or delayed treatment of appendicitis Mikulicz type procedures, delayed secondary resections spur clamps multiple stab wounds, innumerable plugs in the form of so-called drains intravenous injections of saline solution in unprecedented quantities Fowler beds rigid immobilization, starvation regimes, prolonged hospitalization mounting economic costs and frequently subsequent incisional herniations and peripheral thromboses

Although the economic costs to the patient were high, they were still lower than the cost of a funeral and the salvage of human lives was greatly increased An era of thoughtful groping after truth had replaced an era of precipitate action

This was the era of ileostomy jejunostomy colostomy (Paul's tube) peritoneal lavage and, as I remember from my own younger days learned dissertations advocating a prophylactic ileostomy in all cases of ruptured appendix This was the era of pressor substances—eserine pituitrin acetylcholine hypertonic saline solution—aided and abetted by numerous and repeated enemas the constituents of which could only have been devised by a Viennese chef with a profound knowledge of the spicy riches of the Indies Much of this has been discarded, much remains

The current era represents the phase of the surgeon physiologist One thinks now not of a perforated stomach but of a patient with a perforated stomach It is becoming constantly clearer that 'the whole of a man's economy is more important than the part (Zachary Cope) At this time, therefore, it is wise to spend a few hours in retrospect and assess the value of our successive advances

The urgency of acute disease of the abdomen is lessened Early appendicitis early perforated ulcer and early acute disease of the gallbladder are still urgent but once they have been endured for more than twelve hours urgency becomes chiefly a mat of restit

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Presented at the Intermountain Surgical Society Ogden, Utah, May 1949 tion, replenishment and restoration, followed by operation, rather than immediate operation and subsequent salvage. Dehydration in cases of acute abdominal disease has assumed a new aspect; surgeons are now aware of blood chemistry and of protein and hematocrit values. Gone are the days of routine intravenous injections of saline and dextrose; volume and quality of injected fluids are no longer matters of guesswork. The individual patient's need is checked by repeated protein, hematocrit and hemaglobin readings; quantitatively neither more nor less fluids are being given, but better fluids, suited in quality and quantity to the exact needs of the moment, are used.

Perhaps the most striking change in treatment of acute disease of the abdomen has centered around the question of drainage. The vast majority of so-called drains are merely plugs. They do not drain; they permit and encourage mixed infection and create permanent fixed points around which subsequent obstructions may occur and through whose channels of exit incisional hernias may develop. For a long time it has been universally accepted that peritonitis is not caused by soiling or spilling at the time of operation or perforation but is due to continued leakage. Consequently, in the acutely diseased abdomen in which peritonitis has developed, if the source is removed or closed the excess secretion aspirated bone dry, and the abdomen flooded with half a million units of penicillin and powdered with an ounce of sulfathiazole crystals, the incision may be tightly closed to advantage without drainage. If patients are immediately rendered ambulatory, continued gastric or Miller-Abbott tube drainage maintained and supportive measures continued, an astonishingly high percentage will recover completely. In 1938 the mortality rate in the United States for general peritonitis under the old regime was 12 per cent; in 1948 it was 4 per cent. Such residual infection as may remain is usually confined to the abdominal wall; once in a while a residual pocketed abscess may develop and require drainage. Drains should be reserved for those cases in which continued soiling is unavoidable and for those in which large tissue spaces are left bare and oozing fluid collections must be evacuated—for example, after amputation of the breast.

Immediate ambulation has supplanted the rigid immobilization of the Fowler bed. Fowler's position, which was of a static nature and which involved difficult nursing problems and discomfort for the patient, has gone, and with it were wheeled out most of the emboli, phlebitis, cystitis, gas pains, thoracic complications and psychic horrors of the stuffed shirt era in surgery.

Acute intestinal obstruction has lost much of its urgency. In no other department of emergency surgery has the need for restitutional care been more emphasized. The small bowel strangulation of twenty-fours' duration was normally fatal even though relieved; the associated dehydration, dechlorination, nitrogen retention, waterlogged intestine, and derangement of the sympathetic nervous system were less clearly understood than was the fact that a segment of bowel was mechanically strangulated. Surgeons were still proceeding by mechanics rather than by physiology.

Wangensteen's suction technic and its multitubular successors, intestinal deflation, parenteral medication and biochemistry have altered all that. It has long been recognized that extensive surgical intervention in the presence of acute obstruction is highly dangerous; less well appreciated is the fact that even primary operation for simple relief of obstruction carries a high fatality rate and is not to be undertaken in haste. A few hours spent in deflating a gas-distended bowel, in emptying a fluid-laden stomach, in restoring a parched capillary bed, in rendering intestinal flora comparatively inert with streptomycin, aureomycin and sulfathalidine, or in restoring the function of the emunctories is time gained, not wasted.

Half forgotten is the prophetic utterance of Lord Moynihan, "We have made surgery safe for the patient, we must now make the patient safe for surgery." This requires an investment; *an investment in time—time to assess the pa*tient's depletion and to direct intelligently his preoperative restitutional care, time to deflate and evacuate a dilated stomach. Time spent for these purposes will help to eliminate many impressive operative and anesthetic hazards.

I have always believed in and practiced early removal of the acutely diseased gallbladder, but in the past quarter century the question of acute disease of the gallbladder has boxed the compass English and European surgeons have long held the view that the gallbladder with acute disease should be operated upon early In this country there was a more conservative attitude until the last few years but at present early surgical intervention is more and more widely accepted

A well known English surgeon once stated that the acutely diseased gallbladder is no different from the acutely diseased appendix and should be operated on at once In my opinion the analogy is ill chosen, the appendix has a highly infective cavity with intestinal flora, but the gallbladder cavity in most instances is sterile Most so called "acute gallbladders" present obstructive rather than infective disease Usually a solitary calculus has become impacted in the entrance to the cystic duct I have taken many cultures of the contents of diseased gallbladders and in the majority of instances they were sterile In the minority are those gallbladders which become gangrenous and in which infective pyogenic processes develop Appendical diseases, on the other hand are infective from the beginning In the early stages the acutely diseased gallbladder should be immediately operated on and so should be the acutely diseased appendix, but for the acutely diseased gallbladder in which the disease has existed for three or four days before being seen, I favor the expectant conservative approach The urgency for operation has passed, urgency for replenishment and restitutional therapy remains Patients with diseases of the gallbladder should be carefully watched If the condition shows progressive day to-day changes in its overall picture an advancing infection leading to imminent rupture must be predicated and demands immediate intervention If it fails to progress no matter how slow its subsidence it should be permitted to subside

For both gallbladder and appendix a condition that has subsided is always surgical The most common mistake is too early surgical intervention after subsidence, operation should be delayed for months not weeks'

Acute perforation of gastric and duodenal ulcers has always been regarded as an urgent surgical emergency It frequently is but here again a great change has recently come about The obvious question is being asked Are these cases always "rush" cases? Countless cases are on record in which operation was refused or not available The "forme fruste or minute perforation sealed with a lymph plaque, heals without intervention Perforation however, in the presence of a high acid level, an empty stomach and prompt care, may frequently be treated successfully by gastric syphon drainage antibiotics and constitutional support The patient with a low acid level, a full stomach, an extensive fluid leak, flank dullness, and large quantities of free air is always in need of surgical intervention Each case must be a law unto itself

However, even here there is doubt as to which should be done, simple closure or resection In America simple closure is the rule, in Europe, immediate resection has been the policy of choice for some years Likewise, an opinion has been widely current that perforation cures an ulcer Perforation does nothing to alter the ulcer diathesis, but I have found that it is usually an acute ulcer that openly perforates that roughly one third of all such ulcers are cured by their perforation and closure, that one third require continued constant medical care and that one third require subsequent resection.

Undoubtedly there are instances of small perforations, chronic ulcers with minimal leaks, high acid levels, and mobile stomachs, all under the very best auspices, in which primary resection of a free perforated stomach is justifiable My opinion however, is that in these days of high safety in elective surgical procedures, a better time might be found to resect a stomach Simple closure and subsequent resection (if necessary) would seem to me to be the part of wisdom

Many an innocent abdomen has been opened because of a hasty diagnosis of coronary occlusion The ability to distinguish clearly the difference between pain and tenderness is important Pain is a symptom, and any part of the neurologic tree in which it occurs may feel the pain of even remote viscera, but tenderness must be elicited by the examiner, and persistent localized tenderness is never present in the abdomen in the case of uncomplicated coronary occlusion The rewards here go to the unhurried investigator'

Irradiation of the acutely diseased abdomen is a widely used and vastly neglected field. Frequently, or even usually required at night, it is commonly relegated to junior technicians and suffers from amateur interpretations. Probably the most widely known phenomena —laddered loops, free air, and fluid levels— are not too difficult to interpret; but coincident thoracic plates of children, diaphragmatic fixation or mobility and the many other investigative features that are best diagnosed by fluoroscopic means, especially in the seriously ill, warrant the immediate services of experienced roentgenologic personnel thoroughly prepared to do interpretive work.

Probably nowhere is such a service more valuable than in the interpretation of injuries of an acutely traumatized abdomen. Herein lie some difficult decisions. This is no place for hasty or ill considered pronouncements; there are no formulas or catch phrases to help in the decision. Nowhere does maturity of judgment and experience carry greater rewards

The question paramount is, of course: Is there or is there not a hollow viscus ruptured? If there is, as soon as due assessment has been made of shock, hemorrhage and other forms of depletion, it must be repaired. Not so with solid viscera! It is, or should be, an axiom that no massive internal hemorrhage can be surgically approached until adequate measures of restitution have been undertaken If a ruptured spleen or liver is bleeding badly, the patient is in no condition to undergo operation If the hemorrhage has stopped, he no longer requires it; posture, hypothermia, hyperoxygenation and sedation are best As soon as the bleeding has closed, slow drip transfusions of centrifuged blood cells from which the bulk of serum has been removed—blood sludge—quality without volume, should be given almost continuously. I am opposed to massive multiple transfusions for freely bleeding patients Uninfected blood is rapidly absorbed from the peritoneal cavity, and the autotransfusion does no harm. The packing of a crack in the liver from which bleeding has already stopped is gross surgical interference The subsequent opening or aspiration of residual pockets of fluid or abscesses is much safer. When massive hemorrhage coexists with perforation of a hollow viscus, there are no formulated rules

The same principle applies to ruptured ectopic pregnancy. Once rupture with severe hemorrhage has occurred, the major urgency has passed; it is the condition prior to rupture that is urgent! I have treated thirty-three successive ruptured ectopic pregnancies conservatively, without operation and without mortality; two pelvic abscesses required subsequent drainage.

Nowhere in the surgical field does one see the effect of the newer teaching more clearly than in the handling of the acutely diseased abdomen. Although there is nothing more fascinating than to watch a master craftsman at work, whether he is shoeing horses, repairing dentures or operating on the common ducts, the day has passed when a man can gain plaudits through dexterity alone. The old skills have not suffered devaluation, but something new has been added: Modern blood and plasma banks, the splendid fortification of modern anaesthesia, antibiotics, and mechanical suction drainage have given time for more thoughtful surgical approaches. More surgeons are both educated and skilled; fewer are merely skilled.

Urgency is still with us—but urgency tempered with preparedness, guided by a surgeon who is more anxious to cure than to operate. Dante, writing his "Divine Comedy" five hundred years ago, might have had a preview of the modern concept of abdominal surgery when he said, "The mouse has fallen amongst less hungry cats"

SUMMARY

The author discusses past and present concepts of abdominal surgery, with particular attention to acute disease of the appendix and of the gallbladder. He emphasizes the altered concept of "urgency" as applied to these organs, recommending conservative and restorative treatment of many conditions formerly thought to require immediate operation

RÉSUMÉ

Comparaison des opinions passées et présentes quant à la chirurgie abdominale particulièrement en ce qui regarde les états pathologiques aigüs de l'appendice et de la vésicule biliaire L'auteur souligne le revirement d'opinion au sujet de 'L'opération

d'urgence" et recommande le traitement conservateur et fortifiant pour beaucoup de maladies qui à ce que l'on croyait jadis exigeaient l'opération immédiate

RESUMEN

El autor examina los conceptos pasados y presentes de la cirugia abdominal con especial atencion a las afecciones agudas del apéndice y de la vegiga biliar Analiza también la variación del concepto de "urgencia" en referencia a estos organos recomendando el tratamiento conservador y restaurativo de muchos procesos que anteriormente se pensó que requerían una intervención inmediata

RIASSUNTO

Discute i vecchi ed i nuovi concetti sui quali si basa la chirurgia addominale con particolare riguardo alla cistifellea ed all'appendice Richiama l'attenzione sopra il modificato concetto dell' "urgenza," raccomandando in molte condizioni che venivano—nel passato—ritenute urgenti per l'operazione un trattamento conservativo

Recent Honors

Dr Wallace Graham, F I C S, Washington D C, and Dr William Randolph Lovelace, F I C S, First Vice President of the United States Chapter of the International College of Surgeons have been elected Honorary Fellows of the Peruvian Academy of Surgery

Dr Federico E Christmann, F I C S of the Argentine Chapter has been elected Foreign Correspondent of the same organization

Prof Dr Enrique Hertzog, F I C S Regent of the Bolivian Chapter of the International College of Surgeons and Ex President of the Republic of Bolivia has been appointed Ambassador from Bolivia to Spain

Prof Dr Manuel A Manzanilla, F I C S (Hon), Vice President of the International College of Surgeons, has been elected Vice President of the National Academy of Sciences of Mexico

Dr Oswaldo Pinheiro Campos F I C S, Ex President of the Brazilian Chapter of the International College of Surgeons, has been elected President of the Brazilian Society of Orthopedics and Traumatology

Neuralgic Pain Wrongly Ascribed to Posterior Hernia of Intervertebral Discs

Report of Two Cases

PROF. DR. CARLOS GAMA, F.I.C.S.
President, Brazilian Chapter, International College of Surgeons
SÃO PAULO, BRAZIL

IN this paper I shall try to prove that there are posterior hernias of the intervertebral discs which are not responsible for the painful symptoms that sometimes coexist with them.

After popularization of the concept that hernia of "nucleus pulposus," protruding in the spinal canal, was the cause of low back pain and sciatic pain, there was an exaggerated use of surgical treatment to eradicate the hernia. This was followed by many therapeutic failures and by a certain disbelief that posterior hernia of the intervertebral discs could have the pathogenic importance at first attributed to it.

A retrospective analysis of the anatomic studies of Virchow in 1857 and Ribbert in 1911 has shown the great frequency of protrusion of the intervertebral disc. The observations of Schmorl and Andrae showed that, although some neuralgic pain of the lower part of the back and of the legs may have this origin, not all such pain can be so accounted for.

Recently the number of papers on the subject has increased in all medical centers of the world. At the first South American Congress of Neurosurgery, held in Montividéo, Uruguay, in March 1945, the subject was fully discussed.

As I consider this etiologic concept exaggerated, I presented a paper entitled "Hernias Posteriores Dos Nucleos Pulposus Dos Discos Intervertebrais" to the first "Jornada Brasileira de Radiologia" held in São Paulo, Brazil, and to the Peruana Academy of Surgery in Lima, Perú. In this paper I stated that the aforementioned diagnosis is possible only with the aid of perimyelographic or cineperimyelographic study of the material removed at the operation.

Soon afterward I had opportunity to treat this condition in several new cases. This experience confirmed my belief, and in this paper I present proved cases in which hernia was present, protruding into the spinal canal, but was not responsible for pain, which was relieved by treatments irrelevant to the hernia.

REPORT OF CASES

CASE 1.—J. C. F., a white Brazilian farmer aged 61, married, was examined on Aug. 30, 1948.

History.—Since 1918 the patient had had pain in the lower part of the back and bruits in the backbone on movement. In 1926 there were violent muscular contractions followed by subcutaneous suffusions in the same region. For a year the chief complaint was of pain in the left foot, described as "biting" and accompanied sometimes by difficulty in micturition. For twenty-five days he had been given local treatment (hot air and roentgen irradiation of the spinal column).

Examination.—There was thoracic kyphosis. The patient assumed an antalgic attitude, avoiding the placing of his body weight on the left leg. The left gluteal fold was at a low level. There was reduced tonus of the gluteus quadriceps muscle and the left calf. The left achilles reflex was abolished. On the right side it was present but weak. "Stitch pains" in the left knee and sole were noted. Tactile, thermic and dolorous hyperesthesia was observed at the level of the fifth lumbar and the first sacral vertebrae on the left. The Valleix points were tense and painful on the left sciatic nerve. The Kerning and Lasegue signs were absent.

Perimyelographic Study: On August 30, with the patient under fluoroscopic examination (with lipiodol), in the posteroanterior, ventral decubitus and profile positions, a herniation was revealed between the third and the fourth lumbar vertebrae (Fig. 1).

First Operation.—On September 2, operation was performed for hernia of the disc, with section

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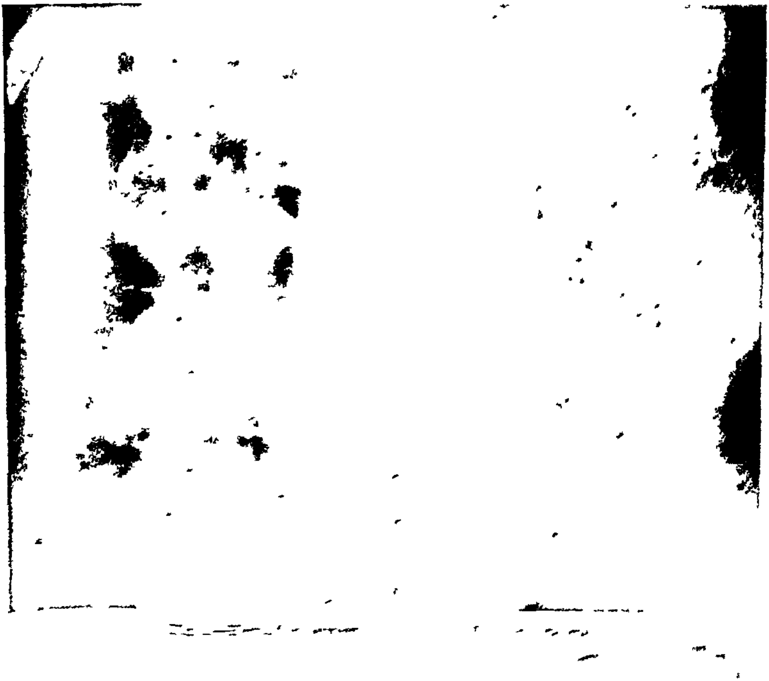
From the Service of Neurology and Neurosurgery of Santa Casa, Dr Carlos Gama, Chief.

of the spinous apophysis of the fourth lumbar vertebrae and partial section of those of the third and the fifth The left side of the arch was excised from the third and fourth lumbar vertebrae The presence of the intraspinal obstacle that elevated the nerve root was confirmed Curettement was performed, the root being spared The dura mater was opened and was flooded with liquid fat (lipiodol?)

The patient's postoperative condition was good A follow up examination on September 10, the patient having complained of persistent symptoms and a dormant sensation in the left foot, showed reduction of the anesthetic area The patient's walking was improved High voltage roentgen treatment was administered to the spinal column, and massage of both legs was ordered

Another examination, on September 21, disclosed a hard nodule and pain of deep origin, referred to the foot The nodule was located in the sciatic nerve in the lower third of the thigh A biopsy was performed, and pathologic examination showed a neurinoma (Verocay) or a perineural fibroblastoma (Penfield).

Second Operation and Postoperative Course On September 25, with intravenous sodium pentothal anesthesia, operation for a neurinoma of the left sciatic nerve was performed The tumor was excised, and a terminoterminal neurorrhaphy was performed The patient was immobilized in a position of flexion (Fig 2) On October 15 he was discharged to his home On May 1, 1940, he asked for alcoholization of the sciatic nerve, a procedure I condemn I suggested instead a crossed anterolateral cordotomy to relieve the pain The patient consulted another surgeon, who exposed the sciatic nerve at the level of the former operation and performed perineural alcoholization On November 14 the patient returned to me, showing retraction of the left leg with intense amyotrophy, tendinous retractions and pseudoankylosis of the coxofemoral joint and the knee joint Crucial pains in the lower



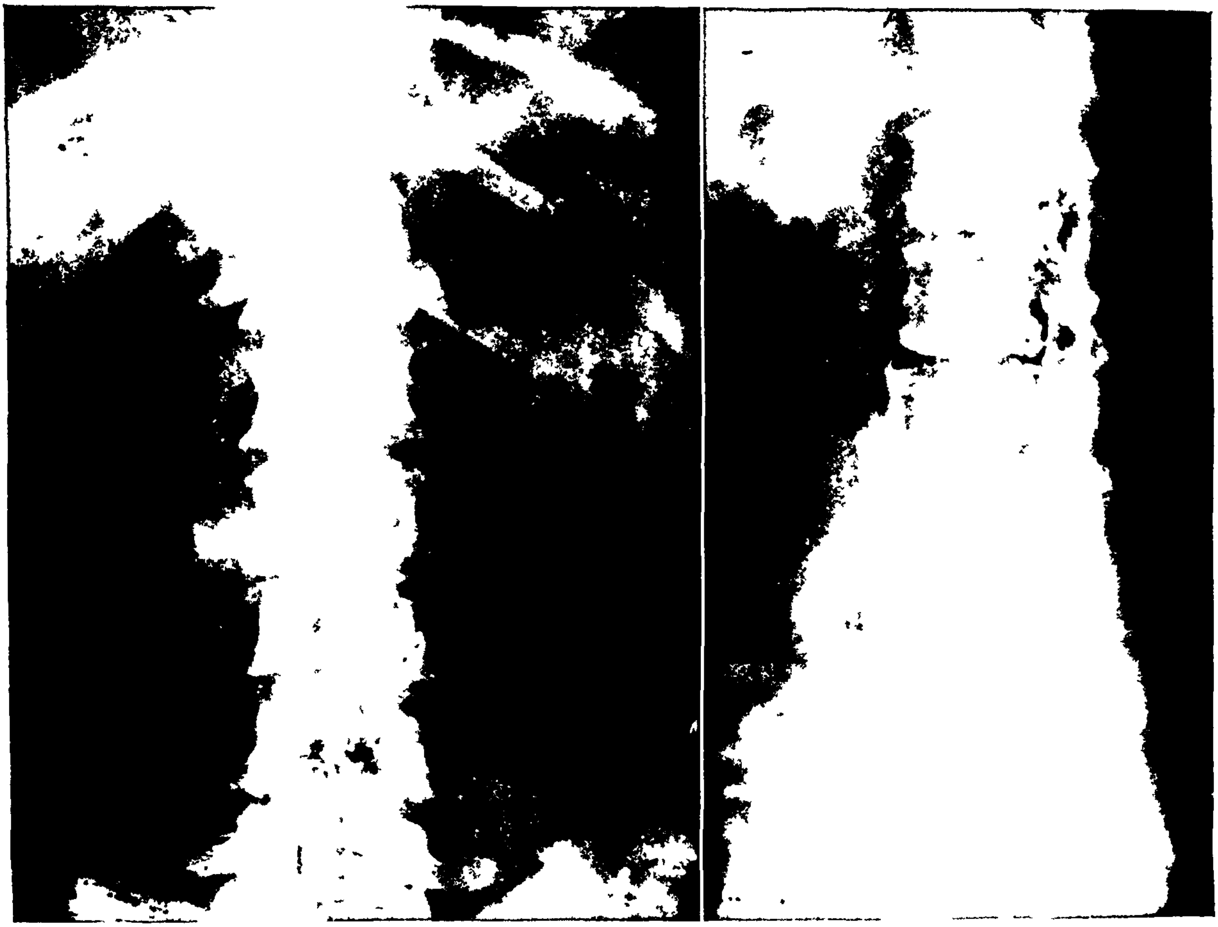


Fig 2 —Roentgenograms of September 25, 1948

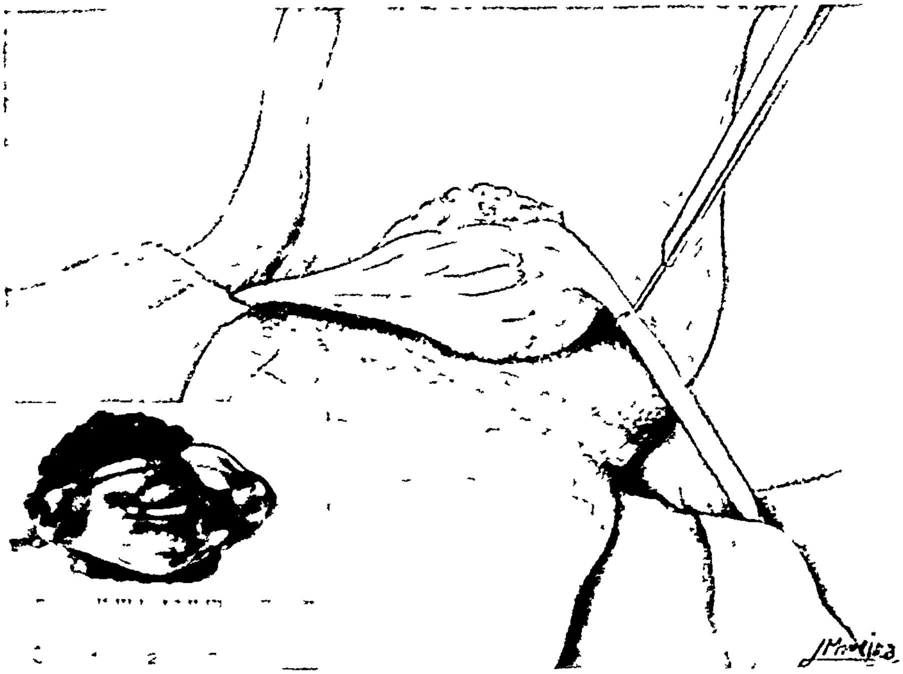


Fig 3 Operative technic *Inset*, operative specimen

part of the back and the left leg were present. The patient had become addicted to morphine.

Third Operation.—On November 15 a crossed anterolateral cordotomy was performed at the level of the sixth thoracic vertebrae.

Result.—The postoperative course was satisfactory, aided by elimination of narcotics, massage of the legs and mobilization of the joints. At the time of writing the patient is in excellent condition and able to walk with a cane. The mobility of all joints has been preserved

CASE 2—On Dec. 19, 1949, P. I., a white Brazilian widower aged 62, an industrial worker, was admitted to my service.

History—In 1935, during a flexion movement of the body, the patient suffered an acute pain in the backbone accompanied by impairment in walking From that time onward such crises occurred frequently. During the month just past he had suffered pain in the lower part of the back, starting in the gluteal region, radiating down the leg past the dorsal aspect of the knee and continuing to the ankle Coughing or sneezing increased the low dorsal pain

Examination—The patient was in a state of numbness resulting from injections of morphine. Deep reflexes could be elicited in the lower part of the left leg. The Babinski reflex was present bilaterally. Slight pains were produced by pressure on the left sciatic nerve No pain resulted from pressure or percussion of the lumbar and sacral spinal apophyses

Cerebrospinal Fluid The following data were obtained initial pressure, 11; final pressure, 7; chloride, 7 Gm , dextrose, 0 61 cg., proteins, 0 4 cg , cells, 0 6 per cubic millimeter, blood cells per cubic millimeter, 10 The Stookey test revealed good permeability of the spinal canal. The Pandy, Nonne and Weichbrodt, Eagle, and Steinfeldt tests gave negative results, as did a test for *Cysticercus*

Perimyelographic Study. This was performed with a lumber injection of 3 cc. of pantopaque, with the patient in the decubitus dorsalis position, on November 23 Fluoroscopic examination revealed that the contrast medium, with the patient in the Trendelenburg and ventral positions, stopped between the third and the fourth lumbar vertebrae Chronic spondylitis, numerous osteophytic formations and deformation of the vertebral bodies were observed (Fig 3). Twenty-four hours later, new roentgen plates showed intense funiculitis of the left lumbar roots, most intense at the second and third levels (Fig 4).

Treatment.—High voltage roentgen therapy was administered to the spinal column After the second application the pain disappeared and the patient returned to his activities in good condition

SUMMARY

In the first case the presence of posterior hernia of the intervertebral disc was proved by roentgenologic and histologic examination of the material excised at operation, demonstrating the presence of physalides in the midst of the collagenous tissue The patient failed to improve after the operation because a neurinoma existed in the left sciatic nerve Wrongly, alcoholization of the nerve was done, and this resulted in neuritis with its consequences Because of the excruciating pain and because the patient had become addicted to morphine, a crossed anteriolateral cordotomy was subsequently performed and enabled the patient to recover with the help of massage and calisthenics

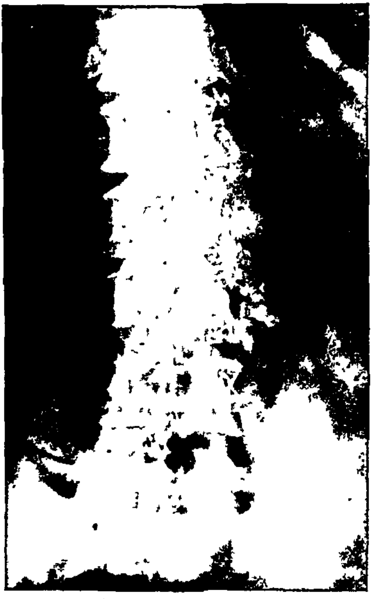


Fig 4—F[illegible] of [illegible] lumbar vertebral roots, [illegible] and third levels.

Case 2 suggests the posterior hernia accompanied by a spondyloarthritic process of the lumbar column. Examination of the cerebrospinal fluid demonstrated a high protein level. Roentgen examination showed protruding hernia of the disc of the third and fourth lumbar vertebrae, and some plates showed the contrast medium penetrating the root-sheaths of the left sciatic nerves, demonstrating radiculitis. Roentgen therapy was administered, and in twenty-four hours the pain disappeared.

RÉSUMÉ ET CONCLUSIONS

La découverte d'une hernie postérieure du disque intervertébral ne démontre pas que celle-ci soit la cause de douleurs du bas du dos et de sciatique. La hernie du disque peut exister en même temps qu'une autre lésion et cette autre lésion peut en être responsable. Dans les cas cités ici, l'excision de la hernie ne fit pas disparaître les douleurs. Lorsqu'une autre lésion existe, elle devrait être traitée avant d'entreprendre l'intervention chirurgicale. La méconnaissance de ce fait contribue au manque de confiance qui existe envers le traitement chirurgical de cette lésion.

RESUMEN Y CONCLUSIONES

Aunque se observe una hernia posterior del disco intervertebral, ello no prueba que el mismo sea la causa del dolor lumbar y del dolor ciático. La hernia del disco puede coincidir con cualquiera otra lesión y esta otra lesión puede ser la responsable. En los casos presentados por el autor la resección de la hernia no tuvo valor en cuanto a aliviar el dolor. Cuando existe una lesión adicional debe tratarse antes de practicar una intervención. La falta de comprensión de estos hechos contribuye a macer perder la confianza en los resultados del tratamiento quirúrgico de esta afección.

RIASSUNTO

La dimostrazione di un 'ernia posteriore del disco intervertebrale non e' una prova sufficiente per attribuire all'ernia la responsabilita' dei dolori sacrali e dello sciatico. L'ernia del disco puo' infatti coesistere con numerose altre lesioni, le quali sono responsabili dei dolori. Nei casi descritti dall'A. l'escisione del disco non ha—per esempio—influito sopra i dolori. Se esistono altre lesioni, queste vanno curate prima dell'operazione. Le deficienze diagnostiche sono responsabili della mancanza di fiducia nella cura operativa delle ernie dei dischi intervertebrali.

In Praise of Famous Men

From time to time there appear on the earth rare and delightful men of resplendent virtue whose eminent qualities shed a wonderful luster about them. They are like those marvelous stars, of the origin of which we know nothing, while we know still less what will become of them after they have disappeared. They have neither forebears nor descendants; they are a race in themselves.—*La Bruyere*

Great men are like meteors, which shine and consume themselves to enlighten the earth.—*Napoleon*

Great men and insignificant men have like accidents, like vexations and like passions; but the former are on the outside of the wheel and the latter near the center, and are therefore less agitated by the same movements.—*Pascal*

No man ever yet became great by imitation.—*Johnson*

The Use of Radioactive Iodine in Hyperthyroidism

A Report of Three Cases Unsuccessfully Treated

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WITHIN a period of three weeks I recently examined, and later operated upon, 3 patients with exophthalmic goiter, who had been unsuccessfully treated by radioactive iodine (I^{131}) As far as I know, this is the first report of its kind to appear in the literature Numerous reports of various groups of investigators, among them Soley, Miller, and Foreman, Haines, Keating, Power, Williams, and Kelsey, Chapman and Evans, and Hertz and Roberts, dealing with the effect of radioactive iodine therapy in cases of thyrotoxicosis, have been presented These papers were given at the American Goiter Association meetings in 1948 and 1949

The reports of these investigators were fair and pointed out the fact that longer periods of observation would be required before definite conclusions could be formulated as to the ultimate effectiveness of this form of therapy Surgeons have long since learned not to speak of a two year cure of cancer, and, in the same sense one does not speak of a cure of exophthalmic goiter Yet, in discussing toxic adenomas the term "cure" may be used correctly, for it is extremely rare that this type of goiter recurs after subtotal thyroidectomy performed by a competent thyroid surgeon The same is not true of exophthalmic goiter This disease may recur five, ten, or even twenty years after an apparently successful operation It is questionable whether one is justified in using the term "cure" with regard to this type of hyperthyroidism It might be preferable to say, as of tuberculosis that the disease is arrested

Most investigators have had an opportunity to observe the effect of radioactive iodine for a period of three or, at most, four years—not a sufficient time to justify pronouncing these patients cured Nor can the term "cure' be used of patients who have adenoma with hyperthyroidism and are treated with radioactive iodine The hyperthyroidism may be brought under control, but the adenomas are still present and, as such, are a potential source of malignancy or may become intrathoracic and lead to cardiac or respiratory embarrassment

The reports of those working in this field indicate that a high percentage of patients respond successfully to this treatment Most investigators frankly admit, however, that all patients do not respond favorably and that failures do occur It is claimed that the percentage of failures is so low as to make this method preferable to surgical treatment with its possible complications One excellent young surgeon, who has been especially enthusiastic in his endorsement of radioactive iodine, has said that if he were the patient and were ten years older he would prefer treatment with radioactive iodine to surgical treatment This implies that he is not sure that the radioactive iodine might not lead ultimately to the development of cancer This fear is lessening, since no malignant developments have been reported to date

Not all reports of investigators have been conservative Unfortunately, in 1947, the colored supplements of the Sunday newspapers from coast to coast contained an article picturing a woman drinking a glass of orange juice containing a few drops of radioactive iodine and curing her goiter This paper was brought before the officers of the American Goiter Association at the Chicago meeting, and the author was condemned for the unethical article and its deleterious effect on the medical profession and the laity

Another investigator reported to both lay and medical organizations that a large series of cases had been successfully treated without a single failure This is not correct, according to statistical studies of the late Dr Mayo Soley and his former associate, Dr E R Miller In a paper presented at the meeting of the American Goiter Association in Toronto these

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From the Jackson Clinic Madison

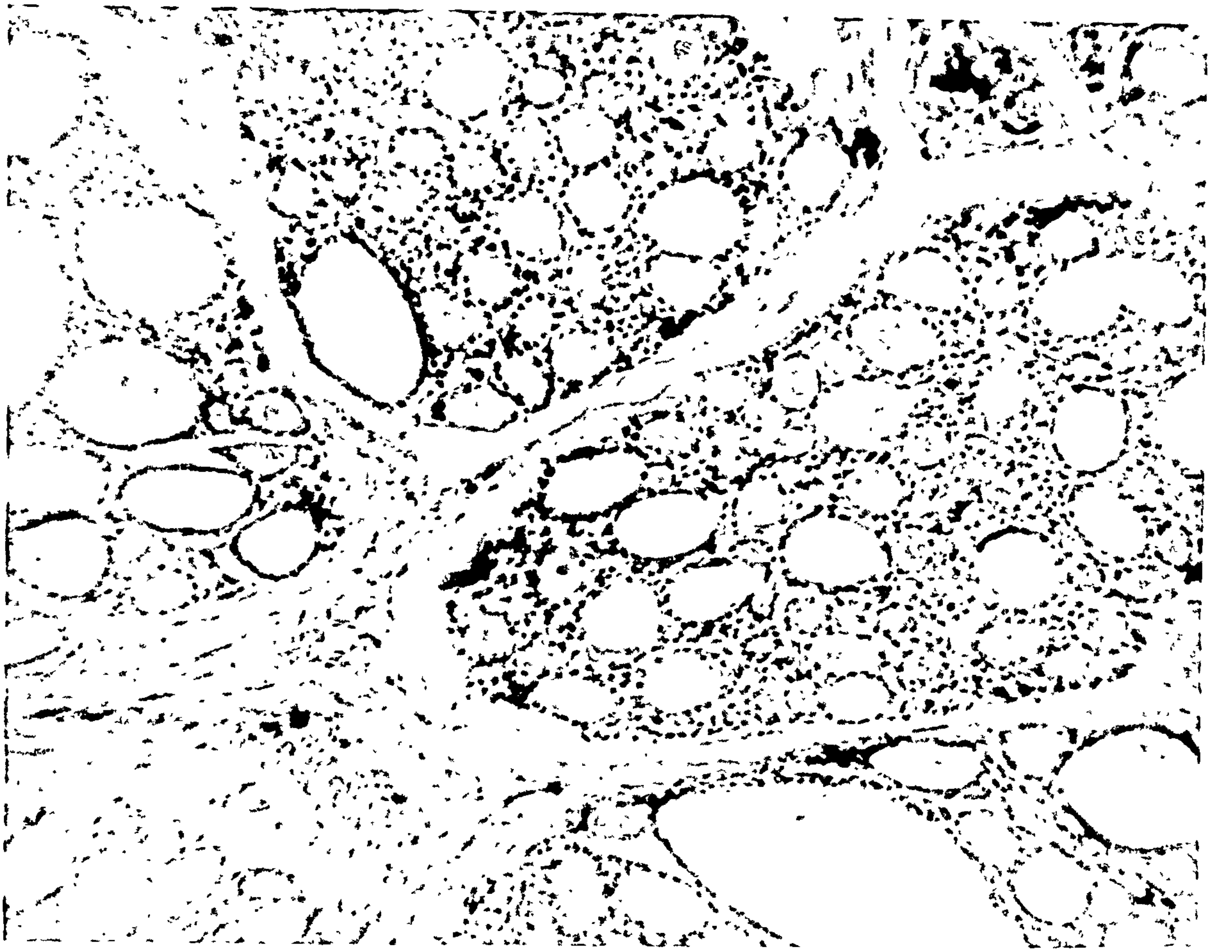

Fig. 1.—Pathologic specimen.

two scientists reported that in a series of 46 thyrotoxic patients treated with radioactive iodine from 1944 to 1948 there were 42 satisfactory and 4 unsatisfactory responses. The latter were believed to be due to a conservative approach to therapy in the early phases of the study. It should be noted that these investigators used the term "response," not "cure." They further qualified their report by stating that radioactive iodine in adequate dosage will destroy subtotally the hyperfunctioning thyroid in a patient with Graves' disease and thereby usually produce a satisfactory remission of the symptoms and signs of hyperthyroidism. They expressed the opinion that further studies would ultimately disclose its place in the therapy of Graves' disease. These capable scientists obviously singled *out* Graves' disease in contrast to toxic adenoma and, in their conservative manner, used the words "usually" and "remission."

Nearly two years have elapsed since that report, and one wonders how their opinion has been modified. At the last meeting of the American Goiter Association, held in Madison in 1949, Doctor Soley was asked to summarize the present status of radioactive iodine. He stated that the total experience of all American investigators included 475 thyrotoxic patients. Good results were reported in 83 per cent of 288 cases; fair results in 9.7 per cent, and failures in 5.5 per cent.

These statistics were tabulated as follows:

	Before Treatment	After Treatment
Thyroid weight	43 Gm.	20 Gm.
BMR	+37 %	+3%
PBI	11.8Y%	6.5Y%
Average total dose	I^{131}	6920 YC
Time reguired for return to normal		4.9 mo.
Post Rx hypothyroidism and myxedema		8.5%

It was thought that exophthalmos progresses less than after subtotal thyroidectomy and more than after roentgen therapy

It is regrettable that such a brilliant and honest investigator should be lost to the *medical profession at a time when so much* uncertainty exists regarding the correct status of radioactive iodine

At San Francisco I recently had an opportunity to hear a splendid symposium on the subject of hyperthyroidism and later to enter the discussion Among the speakers were Dr Robertson Ward surgeon and Dr E R Miller, who is one of the pioneers in the field of radioactive iodine The latter stated that approximately 20 per cent of the patients treated were in the unsatisfactory group Moreover he indicated that, in his opinion radioactive iodine in the future would prove more valuable from a diagnostic than from a therapeutic standpoint

Having lived through the "pre Lugol era' the days of hot water injections, the period of ligation and stage operations, and the rise and fall of roentgen therapy and of thiouracil, I am beginning to wonder if the first wave of overenthusiasm for radioactive iodine is not passing Possibly more experience has shown that cure of exophthalmic goiter with this agent is not as simple as was at first reported Haines and his associates reported from their studies at the Mayo Clinic that much more experience is needed before confidence can be placed in the accuracy of estimated doses They stated that although the ability of this substance to control severe exophthalmic goiter at least temporarily seems definite, it is far too early to draw definite conclusions They pointed out that the incidence of both myxedema and recurrence of exophthalmic goiter after treatment is much higher among their patients treated with radioactive iodine than among those treated surgically

At another great thyroid center, the Lahey Clinic there has been no attempt to substitute this form of therapy for thyroidectomy Why? Because the surgical treatment of hyperthyroidism has been so simplified by the use of such agents as Lugol s solution for exophthalmic goiter and propylthiouracil for toxic adenoma that surgical mortality has been virtually eliminated in the hands of the experienced thyroid surgeon Nor is there any occasion for surgical complications to occur when thyroidectomy is performed by a careful surgeon Granted that operation is not the ideal way of treating Graves' disease it is probably *at present, the quickest and most effective* method of restoring the patient to normal health

My experience with radioactive iodine is limited to 3 patients—certainly a small series, and yet a significant one, in that all 3 patients had been unsuccessfully treated and came to operation as a result Two had received two treatments over a six month period, and one had been given four treatments in nine months The condition of all had become progressively worse They had lost an average of 25 pounds (11 3 Kg) in weight, had suffered progressive exophthalmos and had sustained some myocardial damage These patients reminded me of those treated by roentgen therapy in the twenties, the disease being partially checked

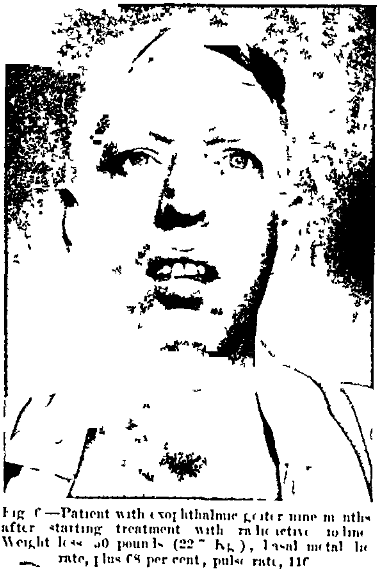

Fig 6 —Patient with exophthalmic goiter nine months after starting treatment with radioactive iodine Weight loss 50 pounds (22 7 Kg), basal metabolic rate, plus 68 per cent, pulse rate, 110

at first, only to grow progressively worse with time.

The 3 patients were prepared for operation in the usual manner, each receiving 30 drops of Lugol's solution daily for ten days. The following observations may or may not prove significant and of importance to other surgeons called to operate upon these patients. The operations were more difficult than is the case with patients to whom radioactive iodine has not been administered. The glands were extremely vascular, like those of patients prepared with propylthiouracil or those observed in the "pre-Lugol era." The first patient had a moderately severe reaction the first day, but the second night he became toxic, the pulse rate rising to 140 and the temperature to 104 F. This was the nearest approach to a crisis that I have observed in ten years and indicates that these patients must be carefully watched for this possible dangerous reaction. His condition was brought under control within a few hours by large doses of Lugol's solution given orally.

In 1926 I had the misfortune to operate upon a patient with exophthalmic goiter who reacted in a similar way. This patient had received Lugol's solution for six months from her physician and appeared in satisfactory condition for surgical treatment. After thyroidectomy a fatal crisis developed. At the 1928 Denver meeting of the American Goiter Association attention was called to this unfortunate result, the prolonged use of iodine was condemned, and the term "iodine-fast" suggested for this condition. Despite repeated warnings by many other surgeons and myself, some physicians still persist in treating these patients over long periods in the hope of arresting the disease. Fortunately, these patients may now be given a preliminary rest period with propylthiouracil.

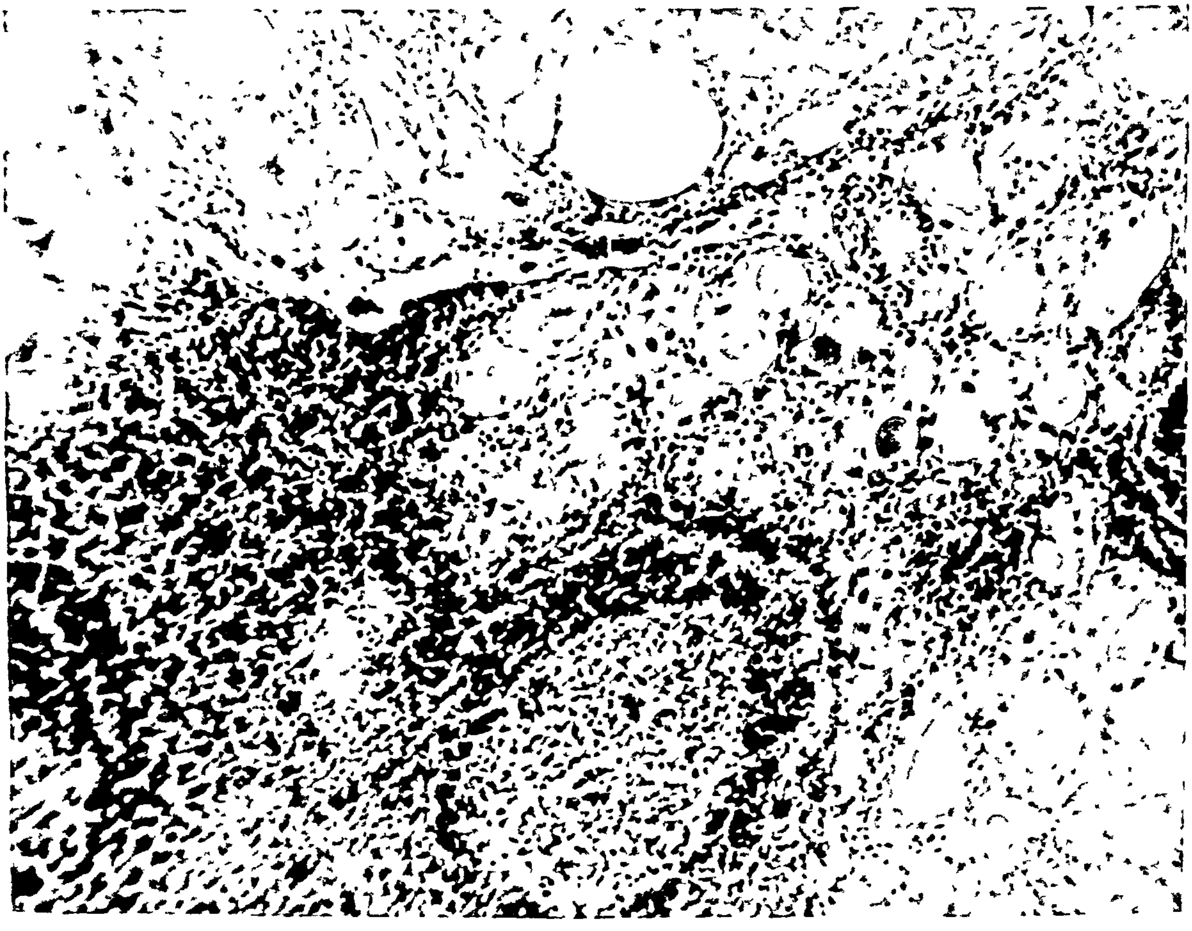

Fig 2 —Pathologic specimen

That is what was done in the third case of this series, a six weeks' course of propylthiouracil being administered before the usual preoperative ten day preparation with Lugol's solution At operation the gland was less vascular, and there was only a moderate postoperative reaction In the second case vascularity was marked, but the postoperative course was not severe

Three cases are too few from which to draw any conclusions, but, since I believe they are the first to be reported it seems important to call attention to them

REPORT OF CASES

CASE 1 —A 34 year old man came to the Jackson Clinic on Dec 7, 1949, complaining of nervousness, loss of weight and palpitation of one year's duration He stated that one year before admission he became extremely nervous and noticed that his eyes were becoming prominent, that he perspired excessively, and that his heart pounded a great deal Since that time he had lost 50 pounds (22 7 Kg) despite a ravenous appetite A coarse tremor of the outstretched fingers had been noticed Nine months before admission he had entered another institution for an operation on his nose At that time the basal metabolic rate had been taken and was "very high" He was then given a dose of radioactive iodine and "assured he would be well soon" For three months he felt considerably improved Five months after the initial dose of radioactive iodine he received another, and for a month he felt better Then he began to feel much worse and to lose weight rapidly On slight exertion he noticed dyspnea

On admission he said he had been drinking six cups of coffee and smoking a package of cigarettes a day This was immediately stopped Stimulants and exophthalmic goiter do not mix well Examination revealed the patient to be in an advanced state of hyperthyroidism He was jittery, making many "purposeful movements without any purpose' (Plummer) Exophthalmos was grade 1 on the right and grade 2 on the left Tremor, grade 2, was present The skin was warm and moist There was quadriceps loss, grade 2 The thyroid gland was symmetrically enlarged and soft, no nodules were palpated, and no thrill or bruit was present The blood pressure was 142 systolic and 72 diastolic, pulse, 116, weight, 166 pounds (83 Kg), and the basal metabolic rate was plus 68 per cent Laboratory studies otherwise gave negative results

The diagnosis was exophthalmic goiter unsuccessfully treated with radioactive iodine Thyroidectomy was advised He was sent home for twenty days' preparation with Lugol's solution, 10 drops three times a day On Dec 28, 1949, a subtotal thyroidectomy was performed, with superficial nerve block anesthesia Operation was tedious because of the extreme vascularity and friability of the gland, which resembled those of the "pre Lugol" era Convalescence the first day was not unusual, but on the second evening, despite large doses of iodine, his temperature rose to 104 F and his pulse rate to 160 Within a few hours this was brought under control with more iodine

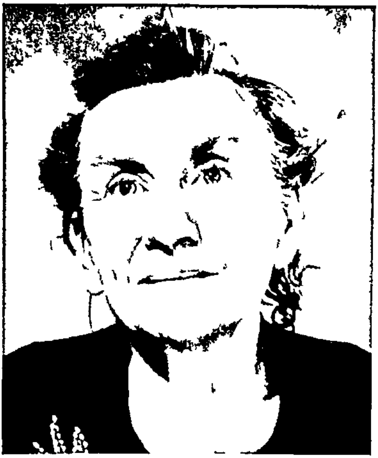
Fig 4 —Patient with exophthalmic goiter with progressive exophthalmos after four doses of radioactive iodine Basal metabolic rate, plus 44 per cent, pulse rate, 89, weight loss, 33 pounds (15 Kg)

The pathologic report showed the specimen to consist of two pieces of thyroid tissue weighing 30 Gm and measuring respectively 4 5 by 4 by 2 and 4 by 3 5 by 1 5 cm One surface of each was covered by a thin connective tissue capsule The opposite surfaces were of pale yellowish red, lobulated thyroid tissue The cut surfaces were similar They were less moist than average Microscopically the sections showed lobules of thyroid tissue divided by narrow fibrous connective tissue septums The lobules contained acini of variable size, some of which were lined by flattened cuboidal epithelium and contained deeply acidophilic cytoplasm Other acini, some within the same lobules, varied from very small, non colloid-containing acini lined by tall cuboidal epithelium to moderately large acini lined by similar epithelium but containing pale staining, finely granular colloid often separated

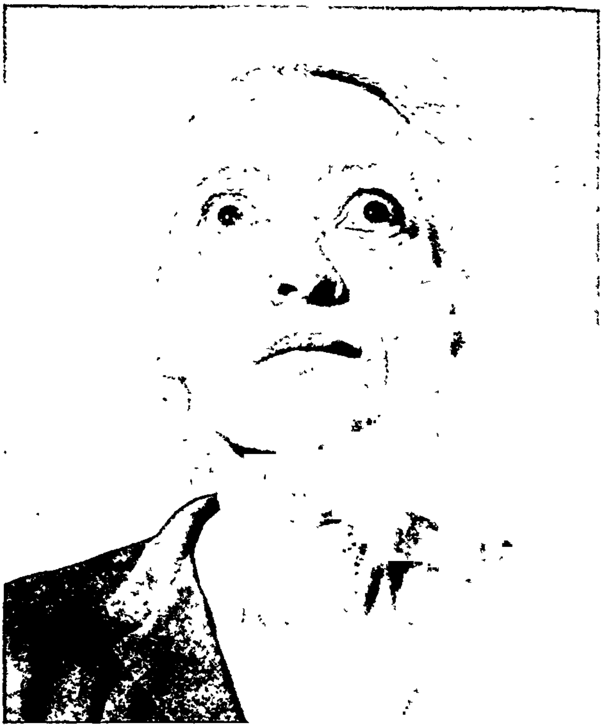

Fig. 5.—Patient with exophthalmic goiter after treatment with two doses of radioactive iodine. Basal metabolic rate, plus 69 per cent; pulse rate, 92; weight loss, 39 pounds. (17.7 Kg.).

from the epithelial surface by vacuoles. Papillary infolding of the epithelial lining was inconspicuous. There was a very sparse lymphocytic infiltrate in a few of the lobules and adjacent portions of the septums. There was also an occasional collection of lymphocytes forming a small follicle. The diagnosis was epithelial hyperplasia of the thyroid.

The patient was discharged to his home physician's care on the fifth day. On Jan. 10, 1950, he returned, and a weight check showed a gain of 11 pounds (5 Kg.) since his admission date. The pulse was 98, and the basal metabolic rate was plus 27 per cent. The patient was advised that, because of the extreme vascularity of the gland and its pathologic appearance, he must take good care of himself if he wished to regain his health. He was directed to continue with Lugol's solution, 5 drops three times a day, and told to return for another basal metabolic test in a month. The patient stated that he already felt greatly improved, that his heart no longer bothered him, that he was sleeping well, that his tremor was gone and that he was much less nervous.

Case 2.—A woman aged 60 was admitted to the Jackson Clinic on Dec. 19, 1949, stating that she had not been well for nine months. She had lost 35 pounds (15.9 Kg.) despite a ravenous appetite, was extremely nervous, perspired excessively, was dyspneic on exertion, complained of palpation and of weakness in the legs on climbing stairs, and had noticed a tremor of the hands. Her physician had given her a basal metabolic test, and, finding the rate high, had referred her to another physician for radioactive iodine therapy. She had received her first dose in August and had felt improved for a month, in that she had been less nervous and had stopped losing weight. In November she had received another dose of radioactive iodine, from which "no improvement was noticed."

Examination on admission revealed a symmetric enlargement of the thyroid gland, grade 1 plus. No thrill or bruit was present. No nodules were palpated, and there was no exophthalmos. There was tremor, grade 2, and quadriceps loss, grade 3. The blood pressure was 150 systolic and 80 diastolic; the pulse rate, 92; the basal metabolic rate, plus 69 per cent; and weight, 126 pounds (normal weight, 165 pounds). Other laboratory tests revealed no abnormality.

The patient was given Lugol's solution, 10 drops three times a day for eighteen days, as a result of which the basal metabolic rate dropped to plus 47 per cent. A subtotal resection was performed on Jan. 6, 1950. The gland was again found to be extremely vascular, making the operation technically more tedious and difficult than usual. There was no marked postoperative reaction.

Pathologic examination showed the specimen to consist of three pieces of thyroid tissue weighing 8 Gm. and measuring 1.4 by 1 by 0.6, 2.3 by 1.8 by 1.4, and 3 by 2.2 by 1.4 cm. One surface of the two larger pieces was covered by fibrous connective tissue capsule roughened by fibrous tags and lobules of fat. Section showed pinkish tan, coarsely lobulated, moderately dry cut surfaces. There were several small pale gray foci scattered throughout the glandular tissue. Microscopically the sections of the thyroid for the most part showed small lobules separated by narrow connective tissue septums. The lobules contained small to moderate-sized glands lined with low cuboidal epithelium and containing colloid. One section contained a well circumscribed nodule surrounded by a dense collagenous connective tissue capsule. The glands making up this nodule were smaller than those of the normal lobulated tissue. Occasionally they were separated by large irregularly shaped spaces lined with tall cuboidal epithelium. In the central portion of this nodule was a focus of fibrous tissue containing many acicular slits and an occasional giant cell. Included cross sections of thyroid arteries showed their walls to be thickened and to contain an undulating line of calcium immediately beneath the intima. The diagnosis was microfollicular adenoma of the thyroid showing focal fibrosis.

The patient was discharged on the sixth day. She was still nervous and jittery but improving. Four days later she stated she was much less nervous, that her heart no longer pounded, and that she was sleeping well.

CASE 3—In *September 1948* a 52 year old woman consulted a physician because of a weight loss of 33 pounds (15 Kg.) in six months. At that time she had a ravenous appetite, complained of palpitation and had marked prominence of the eyes. The basal metabolic rate was then plus 70 per cent. She was referred for radioactive iodine treatment and received a total of four doses. At first she gained 8 pounds (3.6 Kg.), then the weight remained constant for six months. She noticed less palpitation and nervousness, but exophthalmos progressed. There was some blurring of vision, and sometimes her eyes did not focus.

She was admitted to the Jackson Clinic on Nov. 17, 1949, and a diagnosis was made of exophthalmic goiter unsuccessfully treated with radioactive iodine. Examination revealed a symmetrical enlargement of the thyroid gland, grade 2, no thrill or bruit, warm, moist skin, tremor, grade 2, exophthalmos, grade 3, basal metabolic rate, plus 44 per cent, pulse rate, 84, blood pressure, 174 systolic and 88 diastolic, quadriceps loss, grade 2, hemoglobin, 78 per cent, erythrocyte count, 4,030,000, and leukocyte count, 4,500, per cubic millimeter of blood.

Despite the low white cell count, the patient was given propylthiouracil, 50 mg. three times a day, because it was necessary to delay operation for several weeks. She was also given ferrous lextron. Three weeks later she felt much improved, she had gained 5 pounds (2.3 Kg.), and the white blood cell count was up to 6,300. On January 9, despite a head cold of two weeks' duration, the basal metabolic rate was down to plus 27 per cent. She had gained 3 pounds (1.3 Kg.). The value for hemoglobin was 87 per cent, the red blood cell count, 4,480,000, and the white blood cell count, 6,300. The propylthiouracil was then stopped, and Lugol's solution, 10 drops three times a day, was ordered.

On January 23 a subtotal thyroidectomy was performed. All three lobes were enlarged, vascular

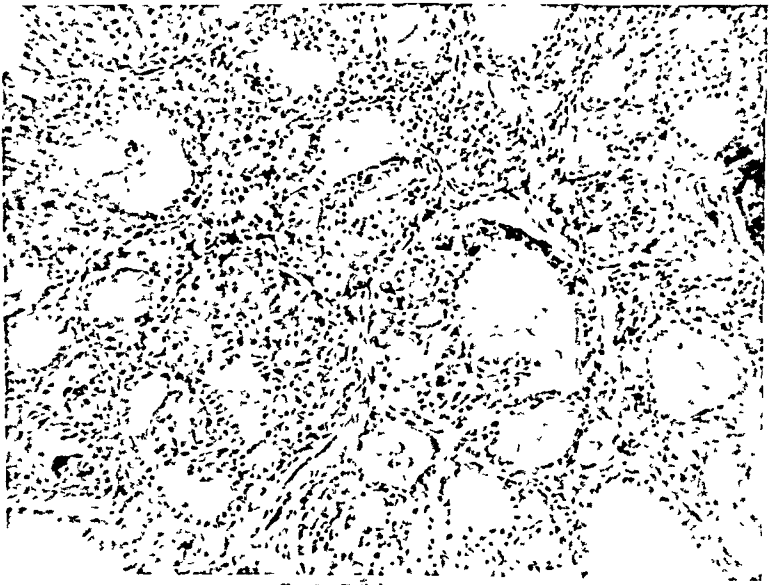

Fig 3—Pathologic specimen

and friable, showing no appreciable effect from the radioactive iodine. The postoperative reaction was moderately severe.

The pathologic report showed that the specimen consisted of two pieces of thyroid tissue of equal size, weighing 13 Gm. One surface of each was partially covered by a thin connective tissue capsule. The opposite surface showed pale pinkish tan, lobulated, thyroid tissue. Cut surfaces were similar except that an occasional focus of yellow calcium was seen. Diagnosis was "thyroid, the seat of focal epithelial and lymphoid hyperplasia, containing two small colloid adenomas."

SUMMARY

Three patients with exophthalmic goiter unsuccessfully treated with radioactive iodine required operation. Their cases are reported.

Treatment had been given to 1 patient four times over a period of nine months and to 2 patients twice in six months.

The question may arise whether further treatment might not have arrested the disease. All patients were becoming progressively worse; all were in a marked stage of hyperthyroidism with an average weight loss of 25 pounds (11.3 Kg.), with an average basal metabolic rate of plus 60 per cent and with progressive exophthalmos.

In the few clinical studies recorded, cases of myxedema and hypothyroidism following the use of radioactive iodine have been reported. No reports have been published concerning patients, similar to those here described, who have failed to respond to radioactive iodine and have undergone thyroidectomy. Further reports are needed so that the actual value of this agent may be determined.

If the published reports, which indicate that 85 per cent of patients with exophthalmic goiter are successfully treated by radioactive iodine, are correct, this agent is definitely another satisfactory method of treating this disease.

The surgical treatment of this condition having reached its present stage of perfection, thyroidectomy undoubtedly will continue to be the method of choice until proved otherwise.

Radioactive iodine has no place in the treatment of adenoma with hyperthyroidism, since only surgical measures will remove the tumor.

Propylthiouracil will prepare patients with severe adenoma with hyperthyroidism for operation, as will Lugol's solution in cases of exophthalmic goiter. Both hyperthyroid states may be reduced to a safe state for thyroidectomy.

RÉSUMÉ

Trois malades souffrant de goître exophthalmique et traités sans succès avec l'iode radioactif, durent être opérés. Leurs cas sont décrits.

Le traitement fut administré à l'un deux, quatre fois, durant une période de neuf mois et à deux autres malades, deux fois en six mois.

L'on se demandera si en continuant ce traitement, l'on n'aurait pas arrêté le cours de la maladie. Mais tous ces malades empiraient progressivement. Ils se trouvaient tous à un stade d'hyperthyroïdisme grave présentant une perte de poids d'environ 11kg, 3, leur taux de métabolisme basal était de plus de 60 pour cent et leur exophthalmie s'aggravait progressivement.

Dans les quelques cas cliniques étudiés, le myxoedème et l'hypothyroïdisme suivit l'emploi de l'iode radioactif. Aucun cas n'a été décrit concernant des malades semblables à ceux que nous mentionnons, qui ne profitèrent pas du traitement et subirent plus tard une thyroïdectomie. Il est essentiel d'obtenir que descas plus nombreux soient signalés de façon à determiner la valeur de cette thérapeutique.

Si les cas publiés, qui indiquent que 85 pour cent des malades atteints de goître exophthalmique, traités avec succès par l'iode radioactif, sont probants, cette thérapeutique est vraiment une méthode satisfaisante pour le traitement de cette maladie.

Le traitement chirurgical de cette affection ayant atteint son perfectionnement actuel, la thyroïdectomie demeurera indubitablement la méthode de choix jusqu'à l'apport de nouvelles preuves techniques.

Le traitement par l'iode radioactif n'est pas indiqué dans les cas d'adénome accompagné d'hyperthyroïdisme, puisqué l'intervention chirurgicale seule est à même d'enlever la tumeur.

Le propylthiouracil aidera les malades atteints. d'adénomes avancés accompagnés d'hyperthyroïdisme à subir l'opération, comme le fera aussi la solution de Lugol dans les cas de goître exophthalmique. Ces deux états d'hyper-

thyroïdisme seront amenés a un stade favorable à la thyroidectomie

RESUMEN

Se trataron sin éxito tres pacientes de bocio exoftalmico mediante yodo radioactivo requiriendose después la intervención, presentandose en esta comunicacion dichos casos Un paciente había sido tratado cuatro veces durante un período de nueve meses, y dos pacientes dos veces en seis meses Se presenta el problema de si de haber continuado el tratamiento podria haberse detenido el progreso de la enfermedad Todos los pacientes fueron empeorando progresivamente, hallándose todos en un lamentable estado de hipertiroidismo con una pérdida de peso de 11,3 Kg con un metabolismo basal medio de + 60% y con exoftalmos progresivo

En los pocos estudios clínicos registrados se han comunicado casos de mixedema e hipertiroidismo a continuación del empleo del yodo radioactivo No se han comunicado informes relativos a pacientes que no haya respondido al yodo radioactivo o hayan sufrido una tiroidectomia similares a los casos ya descritos Se necesitan publicar mas casos para poder determinar el valor real de esta sustancia

Si los casos publicados que indican que el 85 por ciento de los pacientes de bocio exoftálmico se pueden tratar satisfactoriamente por el yodo radioactivo son correctos, este agente puede considerarse definitivamente como otro metodo satisfactorio para tratar esta enfermedad

El tratamiento quirúrgico de este proceso ha llegado a tal grado de perfeccion, que indudablemente la tiroidectomía continuara siendo el metodo de elección hasta que se demuestre lo contrario

El yodo radioactivo no tiene papel para tratar el adenoma con hipertiroidismo, ya que solamente las medidas quirurgicas extriparán el tumor El propiltiouracilo prepara a los pacientes con adenoma grave con hipertiroidismo para la intervención como lo hará la solucion de Lugol, en los casos de bocio exoftalmico Ambos procesos hipertiroideos pueden mejorarse hasta llegar a un grado que represente la seguridad de mejoría para el paciente tratado mediante la tiroidectomía

RIASSUNTO

Riporta tre casi di gozzo esoftalmico, nei quali l'operazione si e' imposta dopo una cura inefficace con iodio radioattivo La cura iodica e' stata somministrata ad un paziente quattro volte in un periodo di 9 mesi a due paziente due volte in 6 mesi Tutti i pazienti erano peggiorati, nel senso che erano in uno stato avanzato di ipertiroidismo, con una perdita media di peso di 11,3 Kg, con un ricambio basale medio di 60% e con un progressivo esoftalmo

Esistono nella letteratura pochi casi, nei quali la cura con iodio radioattivo ha condotto all 'insorgenza di mixedema e di ipotiroidismo Ma non esistino ancora casi, come quelli descritti dall'A, nei quali la cura e' stata completamente inefficace, rendendo necessaria l'operazione

Prima di dare ad ogni modo un giudizio definitivo sopra l'efficacia, o meno, della terapia radioattiva occorrono contributi casistici piu' numerosi Se e' vero che l'85% dei pazienti con gozzo esoftalmico rispondono bene alla cura con iodio radioattivo, possiamo accettare questo metodo di cura come un nuovo sossidio terapeutico Data la perfezione raggiunta dalla cura chirurgica non esiste pero' alcun dubbio *che la tiroidectomia rimane e rimarra' il metodo di elezione fino a che non disporremo di mezzi piu' efficaci*

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Surgical Management of Lesions of the Distal Bowel

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THE surgical management of lesions of the large bowel has assumed an unprecedented plane during the past decade, largely as a result of improvements in anesthesia and advances in the preparation and after-care of patients undergoing formidable procedures.

Carcinoma.—By all odds, the lesion of greatest incidence in this locality is carcinoma, a subject in which we have been chiefly interested. During a period of nine years and four months ending Dec. 31, 1949, our personal records disclose a group of 983 patients with cancer of the large bowel. The distribution by location is appended (Table 1).

TABLE 1.—*Location of Carcinoma*

Site	No. of Cases
Cecum	5
Transverse colon	4
Splenic flexure	3
Descending colon	9
Sigmoid	143
Rectosigmoid	278
Rectum	515
Anal canal	26
Total	983

The type of radical extirpation is shown in Table 2.

The rate of resectability calculated on the number of patients with malignant disease is 79.2 per cent, whereas if computed on the number admitted to the operating room, as suggested by Pemberton, Babcock and Jones, the resectability rate is 87.7 per cent. Since our chief interest has been to evaluate without bias the "pull through" procedure herein referred to as proctosigmoidectomy, patients upon whom this operation was performed have been carefully followed and their charts meticulously studied. It is known that 58.4 per cent are living and well five years after the operation. This includes "favorable cases"—those without glandular invasion or local extension, and "unfavorable cases"—those with glandular invasion and/or local extension, but it excludes those in which there was metastasis to the liver. Although in the last-mentioned group, the patients have not survived the ten-year period, Babcock recently reported a ten-year salvage rate of 47 per cent in his series. The incidence of local recurrence in our cases is 17.9 per cent, which compares favorably with that recorded by others.

Multiple Polyposis.—This disease entity parades under a variety of names, and, although rare, is encountered with greater frequency as a result of routine sigmoidoscopic examination and improvement in double-contrast roentgenologic technic. Our experience is limited to 18 patients (Table 3).

Of the 18 patients, 2 refused operation; ileostomy was established in 1, who did not return for colectomy. In the remaining 15 patients total or partial resection was performed without fatality.

Adenomatous Polyps.—Quite separate and

TABLE 2.—*Type of Radical Extirpation*

	No. of Cases	*Deaths*	*Mortality, %*
Resection (right, transverse, left colon)	17	2	11.7
Sigmoidectomy	106	9	8.4
Abdominoperineal proctosigmoidectomy without colostomy, with preservation of anal sphincters	469	23	4.9
Abdominoperineal excision	177	6	3.3
Hemicolectomy with proctosigmoidectomy	9	1	11.1
Total	778	40	5.1

distinct from the entity previously referred to is the solitary adenoma, or polypoid process, commonly encountered in the colon and rectum. Since the potential of malignant degeneration is exceedingly high, early destruction always is to be recommended. Lesions of known benignity, as disclosed by microscopic examination, located below the peritoneal reflection are destroyed by fulguration or removed by the electric snare We are absolutely opposed to the recommendations of Buie and a few others that early or small lesions known to be malignant and situated on the posterior wall may be similarly eradicated. A malignant lesion demands radical surgical removal not only of the tumor itself but of contiguous structures and node-bearing areas as well.

TABLE 3.—*Multiple Polyposis*

No. of Patients	*Age*	*Sex*	*Incidence of malignancy*	
1	8	F	0	
2	15	F	+	
3	24	M	0	
4	24	M	0	
5	28	M	+	
6	29	M	+	
7	29	M	+	
8	29	M	0	66.6%
9	31	M	0	malignant
10	32	M	+	
11	42	F	+	
12	56	M	+	
13	47	F	0	
14	24	M	+	
15	44	M	+	
16	60	M	+	
17	58	M	+	
18	60	F	+	

Adenomatous polyps above the peritoneal reflection are removed by an abdominal approach through the bowel wall. When the stalk of the polyp measures 2.5 cm. or more, and frozen section confirms its benignity, the process is removed and the bowel wall closed in the classic fashion, with drainage. When the stalk measures less than 2.5 cm. and its base is broad, resection with immediate end-to-end anastomosis is performed. Our experience with transcolonic removal of adenomatous polyps is shown in Table 4. Attention is called to the incidence of malignancy as disclosed by serial section.

TABLE 4.—*Transcolonic Removal of Polyps*

Author	*No. of Cases*	*Mortality, %*	*Malignancy, %*
Mayo & Smith	62	3.2	62.9
Cattell & Swinton	41	2.4	24.3
David	20	0	?
Bacon & Sauer	65	3.0	50.7

Hemicolectomy and Proctosigmoidectomy with Transplantation of the Transverse Colon to the Anus and Preservation of the Anal Sphincter Musculature.—Although limited in its applicability, this procedure has been employed in a small group of patients with extremely satisfactory results, both immediate and remote.

Chronic Ulcerative Colitis.—Though this disease in approximately one-third of all cases can be cured by means of a rigid medical regimen according to Streicher, such authorities as Kiefer and Jordan conclude that the medical treatment of chronic ulcerative colitis must be regarded as a control and not a cure. They further state that the only cure now available is complete colectomy. With this we are in hearty accord. It should be emphasized that the mortality following medical treatment is greater than that following resection.

In a personal series of 248 cases of chronic ulcerative colitis, ileostomy was instituted in 27 instances, with 4 deaths, a mortality of 14.7 per cent. Colectomy, either partial or total, was performed in 22 cases without a fatality. In each instance the rectum was removed. It should be mentioned that over 90 per cent of colectomized patients are rehabilitated.

Inflammatory Rectal Strictures.—Our experience with lymphogranuloma venereum as related to inflammatory rectal strictures is based on a series of 718 patients with organic narrowing of the bowel. For nearly a decade various chemical, biologic and physical agents were employed, with but little success. Palliative surgical procedures likewise offered only temporary respite. Resection or excision proved to be the procedure par excellence. In the presence of anal esthiomene, multiple abscesses and fistulas the anal sphinctures must be sacrificed; therefore colostomy and later posterior excision is recommended. Otherwise, proctosigmoidectomy without permanent colostomy and with preservation of the sphincters is instituted. We have had no mortality

TABLE 5.—*Transplantation of Transverse Colon to Anus*

Patient	*Race*	*Sex*	*Age*	*Diagnosis*	*Deaths*
1. C.B.	W	M	32	Polyposis with malignancy	0
2. E.A.	W	F	42	Polyposis with malignancy	0
3. W.J.	W	M	35	Adenocarcinoma	0
4. G.W.	W	M	63	Diverticulitis with stricture	0
5. S.M.	W	M	28	Carcinoma	0
6. B.S.	C	F	46	Inflammatory stricture of colon and rectum	0
7. M.L.	W	F	32	Ulcerative colitis and malignancy	0
8. M.B.	C	F	57	Malignancy	0
9. M.K.	W	M	62	Malignancy	0
10. R.S.	C	F	38	Inflammatory stricture from low rectum to splenic flexture	0
11. J.K.	W	M	65	Polyposis with malignancy	0
12. G.McC	W	M	50	Malignancy and diverticulitis	1
13. E.R.	W	M	50	Malignancy	1

TABLE 6.—*Left Hemicolectomy and Proctosigmoidectomy*

Number of cases	13
Mortality	7.6%
Postoperative period of hospitalization	14.2 days (average)
Return to work	2½ months (average)

from the latter type of resection, but the morbidity has been marked, for which reason a transversotomy is performed initially as a temporary procedure.

scess, perforation, fistula and obstruction. More than occasionally it is impossible to distinguish between malignant disease and diverticulitis, for which reason exploration under such circumstances is justifiable. In our opinion, removal of the diseased segment of bowel is indicated in the presence of recurring symptoms and in cases in which a fistula exists after complete proximal defunctionalization; also in cases in which malignant change is indeterminate. In our group of 115 patients with diverticulitis, 39 were subjected to operation as shown in Tables 9 and 10.

TABLE 7.—*Surgical Treatment of Chronic Ulcerative Colitis*

Author	*Ileostomy*	*Mortality, %*	*Colectomy*	*Mortality, %*
Cave	65	18	55	10.9
Cattell	145	18	121	20.8
Garlock	38	15.7	46	10.8
Bargen & Pemberton	130	26.9	30	36.3
McKittrick	54	27.7	10	10
Rankin	26	31.7	—	—
Lemmer	17	23.5	11	18
Ferguson	14	—	9	—
Best	8	12.5	?	—
Ault	6	16.6	13	15.3
Rhoads	36	5.5	24	10.5
Wangensteen	—	—	13	0
Bacon & Sauer	27	14.7	22	0

Diverticulitis.—There is common agreement that a good proportion of patients suffering with diverticulitis will respond to nonsurgical therapy. Too, there is little difference of opinion that the complications of this disease require surgical intervention. Among these may be mentioned peridiverticular ab-

Endometrioma.—There were 4 cases of endometrioma of the rectosigmoid. All were diagnosed after operation. Proctosigmoidectomy with preservation of the sphincters was performed in 3 instances. The other patient

TABLE 8—*Mortality Rates*

	No of Cases	*Mortality %*
Abdominoperineal excision (Miles)	8	0
Colostomy and perineal excision	51	1 9%
Abdominoperineal procto sigmoidectomy	28	0
Hemicolectomy and procto sigmoidectomy	3	0
	90	1 1

was treated by resection with end to end anastomosis also with a successful result

RÉSUMÉ

Les auteurs presentent leurs séries de cas de cancer du gros intestin, de polypose multiple de polypes, de colites chroniques ulcératives de formations inflammatoires de diverticules et d'endométriômes Le taux de mortalité et de morbidité est moins élevé et le pourcentage de survie pour les malades atteints de carcinome peut être comparé à celui d'autres statistiques

La transplantation du gros intestin transverse au perinée est décrit pour souligner l'aise avec laquelle on peut résoudre par la quelques problèmes des plus difficiles, tels que la polypose la diverticulite propagée a une importante partie de l'intestin et, (pour quelques cas), la colite ulcérative segmentaire

RESUMEN

El autor presenta una serie de casos de cancer del intestino grueso, poliposis múltiple pólipos, colitis ulcerosa crónica, procesos inflamatorios, estenosis inflamatoria diverticulitis y endometrioma El porcentaje de mortalidad y morbilidad decreció y el porcentaje de supervivencia en los pacientes con carcinoma puede compararse a los observados en otras estadísticas Se examina la transplantación del colon transverso al perineo por su conveniencia para solucionar algunos problemas dificiles, tales como poliposis, diverticulitis extensa y, en algunos casos colitis ulcerosa segmentaria

RIASSUNTO

Presentano una vasta statistica personale di carcinomi del colon, di poliposi di polipi, di coliti ulcerative croniche, di diverticoli e di endometriomi La mortalita' e la morbilita' sono diminuite, la percentuale di sopravvivenza dei carcinomi viene confrontata con altre statistiche

Discutono le indicazioni di un trapianto del

TABLE 9—*Various Operations for Diverticulitis*

Operation	*No of Cases*	*Deaths*	*Mortality, %*
Colostomy for obstruction	5	1	20
Incision & drainage abscess	3	1	33 3%
Drainage for perforation without closure	2	0	0
Exploration only	2	0	0
	12	2	16 6

TABLE 10—*Resection for Diverticulitis*

Type of resection	*No of Cases*	*Deaths*	*Mortality, %*
Exteriorization	6	0	0
Abdominoperineal proctosigmoidectomy	4	0	0
Abdominoperineal proctosigmoidectomy with hemicolectomy	1	0	0
Primary end to end anastomosis	10	1	10
Anterior resection (excision) with colostomy and exteriorization of closed rectal stump partial cystectomy in four	6	0	0
	27	1	3 7

colon trasverso nel perineo in taluni casi complicati o difficili: come nelle poliposi. nelle diverticoliti molto estese e (in taluni casi) nelle coliti ulcerative segmentarie.

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European Medical Schools Accepted By A. M. A.

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Denmark—University of Copenhagen
Finland—University of Helsinki: Turku University
Netherlands—University of Amsterdam; Royal University of Groningen; Royal University of Leiden: Royal University of Utrecht
Norway—University of Oslo
Sweden—Royal Charles University. Lund: Charles Medico-Surgical Institute. Stockholm: Royal University of Uppsala
United Kingdom—Universities of Aberdeen. Birmingham, Bristol. Cambridge. Durham. Edinburgh. Glasgow. Leeds. Liverpool. London. Manchester. Oxford. St. Andrews. Sheffield. and Wales: Queen's University. Belfast

The Broadened Scope of Otolaryngology

FRANCIS L. LEDERER, M.D., F.A.C.S.

CHICAGO

HISTORIANS have related for us the progress of medicine and surgery since the dawn of man. Their researches make interesting reading. Out of the maze of such literature as pertains to the development of the art of surgery emerges the story of a struggle for recognition and survival. In the early thirteen hundreds there already was a distinction drawn between "men of the long robe" (the surgeons) and "men of the short robe" (the barbers). The centuries that followed this turbulent epoch witnessed many changes characterized by clashes against disease, personal and political differences, bigotry, quacks and charlatans, and man's own environmental transcendency.

"It is a curious fact," stated Clendening,[1] "that the subjects that we now call specialties—diseases of the eye, ear, nose and throat—were very late in developing, and until 1800 were almost literally relegated by the medical profession to the quacks. The plight of a patient with an eye or ear disease up to the end of the eighteenth century was pitiable in the extreme." A hundred years ago otolaryngology represented a peculiar branch of medicine. It is said that when Abernethy was asked to serve as honorary president of the London Eye and Ear Infirmary he replied: "I can see no good that can arise from this to the public; it may be of use to the surgeons, but I candidly tell you I consider it quackery; I will never lend my name to sanction it; every surgeon should be acquainted with the diseases of the organs of sight and hearing, and to detach them from regular surgery would be not less injurious to the science than oppressive to the public."

Through the years many another effort has been made to show the evils of specialization. Isaac Harvey Flack,[2] writing under the pseudonym of Harvey Graham, remarked that in one sense Abernethy was right. "Specialization has inevitable disadvantages, but the many specialties into which surgery has been divided would not be surviving and indeed flourishing today if they had not justified themselves by their accomplishments. The great empires of more than a thousand years ago saw their surgery decay not because their surgeons specialized but because their surgeons achieved nothing." Clendening likewise observed: "Specialization may not be a more desirable thing, but it is an undoubted fact that the cooperation of specialists in innumerable overlapping departments has effected changes in the structure of medicine and surgery greater and more lasting than any previously known."

A more pointed statement was recently made by Wangensteen,[3] who said: "There are still a few surgeons who affect to believe that they can take all of surgery for their province. They know as anyone that their performance in such a wide category of operative procedure is substandard in some of these areas when judged in the critical light of what constitutes good practice. Let us be thankful that the day of the all around surgical specialist is done! Surgery is not advanced by that type of activity. . . . No matter how talented the surgeon, he cannot do equally good work in all these provinces."

Otolaryngology as a specialty had its beginning in the field of thoracic disease, the upper portion of the respiratory tract being considered inseparable from the lower. The preceptor system served as the background for workers in this field and the training was comprehensive, with practice under supervision. Undergraduate teaching in the specialty was not given its deserved place, nor were a sufficient number of hours allotted to it in the curriculum. (Even today, many schools of medicine fail to give undergraduates the opportunity to become conversant in the field or the knowledge that is necessary to conduct a complete examination of the ear, nose, throat and larynx. In our undergraduate

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From t[illegible] University of Illinois C[illegible]

Read a[illegible] of the United States C[illegible] Surgeons, St. Louis, N[illegible] teaching we include only such basic knowledge as enables the student to integrate otolaryngology with medicine as a whole and later, as a practitioner, to recognize situations that require expert assistance.) Well organized postgraduate facilities in the United States were lacking. Those who were interested in the specialty sought opportunities for study abroad, where well rounded curriculums did not exist and where the choice of subjects and instructors were left entirely to the student.

Specialization by convenience or self-appointment is no longer considered justified, nor is it condoned. Granted that education of the physician must be a continuing process throughout his life, self-education is not always the most expedient or reliable approach. Progress has resulted from the demands of specialty boards that candidates be motivated and adequately trained in the arts of medicine and surgery. The acquisition of correct surgical technics must be predicated upon a basic knowledge of anatomy, physiology, biochemistry, bacteriology and pathology, especially of the organs and physical structures concerned with the field in which the physician seeks recognition. To meet these standards, rigid courses of study have been set up, to be followed by carefully planned resident training programs.

Otolaryngology has kept faith and pace with the general advances of medicine and surgery. It has profited from contributions to the knowledge gained in other fields of endeavor, but it has also made its own share of contributions to the fundamental concepts of disease and to the advancement of surgical technic.

Like most other new developments, the specialty of otolaryngology was at first not too thoroughly appreciated. The etiologic, physiologic and pathologic aspects were as vague and limited as the therapy was inadequate. As long as the field was restricted to a few mechanical procedures, it remained barren of real progress and advancement. Enrichment and progress were made possible by the leadership of men whose vision created separate and autonomous departments in universities and organized the second examining board 1924 to determine, and thus stimulate, a higher level of training for specialization and medical practice. The resulting disciplines led to recognition rather than neglect of the fact that the organs or parts of the head and neck are not anatomically, physiologically or pathologically independent organs, but are integral parts of the human physical economy. As Alan Gregg[4] aptly stated, "I should like it to be a cardinal axiom of medicine that an organism is so intimate a relationship of constituent parts that you cannot modify any one of them without affecting all the others; and that, therefore, a given result comes usually not from one cause but from a combination of causes, sometimes a sequence, sometimes a constellation or pattern; and similarly that a given cause has not merely one but many results, *sometimes in sequence, sometimes in a pattern.*" In other words, the basic concept of the "total person" predicates the rational approach to medical or surgical management.

We might inquire of ourselves, "Is otolaryngology a narrowed or a restricted specialty, and what gave rise to it in its present form?" It embraces the fundamental aspects of disease of the ear, nose and throat, surgery of the neck, reconstructive surgery, bronchoesophagology, allergy, physical medicine and audiology. In all specialities there is some overlapping at the borderline, and each specialty tries to claim for its own the duties and functions rightly belonging to others. For example, the inguinal hernia has been said to belong in the domain of the plastic and reconstructive surgeon; yet this operation is performed by general surgeons. Nerve suturing in the extremity would seem to call for a neurosurgeon, but it is performed by orthopedic and plastic surgeons as well. Fracture of the face and jaws would seem by definition to lie within the realm of plastic surgery, but it is also within the scope of the oral surgeon. Such examples may be observed in all branches of surgery; we all have witnessed advancements and new technics that make it possible for one specialty to take over the new development and become proficient in the field. A striking example is to be found in thoracic surgery, whose experts were taught the use of the bronchoscope by men in our field.

The specialty of otolaryngology is no more static than any other specialty. Becoming extremely proficient in the knowledge and art of an area of the body of which one already has an intimate understanding, one merely adds to the technics that may be applied to the head and neck The field for expansion is unlimited It is not my belief that one must first become a general surgeon, later taking up the specialty as an afterthought or sideline, so to speak, however, a knowledge of general surgery is a *must* and has tremendous value in preparation for any surgical specialty As has been stated, no man can do more than master one specialty in a lifetime Mastery of the entire field of surgery is a goal too difficult for any one to attain

To put it concretely and succinctly, the otolaryngologist is at loggerheads with the general surgeon who would limit him to the arbitrarily determined anatomic spaces of the head or neck, without himself having a basis, by virtue of his own preparation, training and experience, to assume unrestricted qualification for surgical intervention in the adjoining areas Can the general surgeon's basic preparation in the study of the head and neck match that of the otolaryngologist? If so, let him proceed, but if not, let him qualify himself, for that is what we expect of those who come under our direction

Arguments as to "who does what, with which and to whom" must not take personalities into consideration but must present a problem with a solution An economic situation must be recognized and brought to the surface without regard for individual feelings or even for propriety Just as the medical practitioner objects to the position of the general surgeon, who receives what he considers to be a disproportionate financial remuneration the general surgeon objects to the position of the surgical specialist What he resents in his medical colleagues he actually practices in relation to his colleagues in the surgical specialties The remedy for this paradoxical situation is suggested in the adage, "Surgeon cure thyself" Science changes but ethical precepts and moral codes require no revision or repair

Training of the specialist based solely on the conventional residency will always fall short of its goal At the University of Illinois we have tried both plans and have found that a carefully conducted basic course, prerequisite to residency, is of greater value both to the specialist in training and to the service of the hospital Careful study of hospitals accepted for resident training will prove conclusively that the majority are not in a position to give adequately planned training without the prerequisite of a basic course in otolaryngology The in service type of training during a busy residency period is too much of a hit or miss proposition Generally speaking, it benefits only the physician, who, on his own, can eventually complete a prescribed course of study, but even for him it is not a desirable approach Gallie[5] recently propounded this question "How many hospitals do you know where a three year assistant residency is offered, or where regular ward rounds or conferences are held, or where supervised courses of study are provided in anatomy, applied physiology, and applied pathological chemistry? And how many hospitals do you know where interns are encouraged to make use of the libraries or to take part in surgical research? The answer is, very few There are, of course, outstanding examples to the contrary, where the training of the intern is a major interest of the staff, but when one adds up the number of these hospitals and makes up the grand total of graduates receiving such training, it will be found that the number is very small"

It might be well to examine the curricular requirements of the basic course in otolaryngology at the University of Illinois which is designed to stimulate the initiative, aptitudes interests and talents of those desirous of taking up the specialty (In another publication we have given the details of this project[6]) The selection of subject matter and the hours assigned (approximately 1,800) indicate the scope and intensity of study in complete preparation for the specialty of otolaryngology

		Hours
1	Anatomy of the Head, Neck and Thorax	
	Dissection	240
	Gross and Microscopic Anatomy	80
	Surgical Anatomy	60
2	Embryology of the Head and Neck	24
3	Histology and Pathology—General, Special	200
4	Physiology	30

5. Bacteriology	72
6. Pharmacology	72
7. Anesthesia	10
8. Allergy	36
9. Neurosurgery	10
10. Dermatology	10
11. Plastic and Maxillofacial Surgery	100
12. Bronchoesophagology	100
13. Didactic Otorhinolaryngology	160
14. Surgical Procedures	130
15. Laboratory Technics	12
16. Clinical Seminars	100
17. Pediatric Aspects	6
18. Stomatology	16
19. Bloods and Its Disturbances	6
20. Psychosomatic Aspects	6
21. Otolaryngological Forum	30
22. Aviation Medicine	4
23. Tuberculosis	6
24. Surgical Clinics	30
25. Prosthetics	8
26. Special Problems	100
27. Medicolegal Problems	6
28. Clinic Routine	30
29. Speech and Hearing Disorders	60
30. Miscellaneous Subjects	100

This course is designed to attract the highest caliber of medical graduate, for whom an additional four to five years of serious study in preparation for the specialty assumes meaningful proportions. He has already completed a rotating internship in an approved hospital, with at least six months of general medicine and six months or more of general surgery and pathology. At the completion of the basic course he enters an approved residency.

We insist that continued supervision of this part of the two- to five-year period be arranged with a definite curriculum in mind. It may be of interest to examine the resident training program in the Chicago area, because it clearly exemplifies the entire situation. A truly basic course should be thought of as such and the practical training left for the residency period. The importance of teaching the resident the general principles of modern medicine and surgery is a foregone conclusion. This is fundamental because of the dependence of one part of the body on another. Without a broad background of training in the whole field of medicine, the specialist could not be so designated. Any tendency on the part of the specialist to lose the broad grasp of medicine as a whole, and to look for the cause of ill health solely in his own narrow field, is to be deplored. He must possess the ability of "listening with the third ear" (Reik[7]), the intuitive sensibility and empathy that are among the necessary talents of a good physician. The resident must first of all be taught to be a good doctor. He must have the ability to contend with and recognize underlying diseases and to handle emergencies. This presupposes a knowledge of the basic sciences. Without this advantage, he would fall short as a specialist, in the identification and treatment of disease.

In Chicago, we have attempted to pool all available resources in the interest of an effective three- to five-year residency training program. The purpose is to provide adequate training of residents in otolaryngology through the joint and reciprocal efforts of interested hospitals and medical schools in Chicago. In the past, each institution and school has concentrated on its own educational program. The combined resources, facilities and staffs produce an integrated effort of far greater value.

Approximately 35 men are being trained in residencies in otolaryngology in the various hospitals of Chicago. Each institution's educational scope is limited in some respect. Utilizing the facilities and advantages of all organizations through a regulated teaching program and a rotating exchange service gives each resident the opportunity to obtain not only a broader type of training but a great many more varied professional contacts. Such a plan makes up for any deficiencies in the training program of any single institution.

Each resident is required to have had at least one year of basic training in a recognized postgraduate course of otolaryngology. Each hospital selects its own residents and has complete control of their training within its walls. It is required of the resident, with the cooperation of the staff, that he attend all organized and scheduled courses of instruction wherever and whenever these are given. A monthly schedule is issued and sent to the Head of the Department of Otolaryngology in each organization, so that the necessary arrangements may be made in advance. For hospitals having more than one resident, arrangements are made for each resident to obtain the full course of instruction without the necessity for both participating at the same time. Appropriate programs for resident training are outlined and carried out by each institution. This includes supervised clinic work and operative work (both private and charity). Where facilities are available cadaver dissection and dog surgery are given. Adequate reference literature is available and the residents are given guidance in clinical and investigative research.

This program is also designed to enable the residents to attend a scheduled course of instruction held at the various affiliated institutions. Each attends the regular meetings of the Chicago Laryngological and Otological Society and reading club groups held at his hospital. Each participating institution is required to give a series of lectures or clinical demonstrations at specified times to the entire group of otolaryngologic residents at the Chicago Hospital Group. These sessions are held in the evening, not to exceed one month for each institution, and programs are published in advance in the monthly bulletin. Attendance is obligatory for all residents.

Whenever practicable each resident has the opportunity of serving several monthly periods in other institutions such as the Illinois Eye and Ear Infirmary, the Municipal Tuberculosis Sanitarium, and Cook County Hospital. This rotation service is optional. During the resident's absence a resident from one of the affiliated hospitals substitutes for him. Adequate quarters and maintenance are furnished the substitute resident. Not more than three months of each residency period are taken up by this rotation service.

For those residents who are preparing for otolaryngology as a head and neck specialty we have provided a five year plan. This period is made up of one year's basic study of otolaryngology, two years of general surgical residency (with emphasis on surgery of the head and neck), one year of a general otolaryngologic residency and a fifth year as resident on the head and neck specialty service.

The respects in which a broadened concept of otolaryngology goes beyond the fundamental aspects of diseases of the ear, nose and throat have already been mentioned. With regard to surgery of the neck, it is our opinion that the otolaryngologist should be versed in this type of surgery, not only because this area is often neglected but because he comes by it naturally as the result of his superior basic training in cervical anatomy. The anatomy and physiology have been approached locally mainly from the standpoint of thyroid surgery, apart from this only a few general surgeons have interested themselves in this anatomic region. The few who have qualified in it have been skilled surgeons, but they are the exception rather than the rule. We need surgeons who are acquainted with the neck, not just surgeons who occasionally operate on it. We need surgeons with prerequisite training and skill to become masters of every critical situation. Since the majority of metastasizing tumors in the neck have their primary origin in the areas of which the otolaryngologist has special knowledge, it is a logical step for him to assume responsibility for areas of secondary extension. His long identification with the formidable procedure of laryngectomy is certainly sufficient proof of his proficiency.

In the field of reconstructive and reparative surgery, there is great opportunity for the well trained otolaryngologist. Rhinoplastic surgery is but a small part of the field. Burns of the face and neck, traumatic wounds, and congenital defects and deformities present a challenging group of conditions especially designed for the otolaryngologist with an adequate background.

The training of the otolaryngologist in bronchoesophagology places him in a preeminent position to deal with structures surrounding and related to the larynx, the trachea and the upper part of the esophagus. Pharyngeal diverticulum is an excellent example of the combined endoscopic and external surgical procedures made possible by this knowledge. Reparative external laryngeal procedures for the establishment of an airway after bilateral abductor paralysis of the larynx is another example of the combined approach for which the otolaryngologist had adequate training and experience. The diagnosis and management of bronchopulmonary disease have been greatly enhanced by bronchoscopic study. Whereas in former years the broncho scopic approach was mainly associated with foreign bodies, the modern management of tumors of the bronchi (malignant as well as benign), pulmonary abscess, bronchial asthma, postoperative pulmonary atelectasis and tuberculous tracheobronchitis has been aided immeasurably by bronchologic advances.[8]

The belief expressed by the uninformed, that otolaryngology is rapidly becoming a restricted specialty, is refuted by the fact that the present-day specialist is required to know more than did the specialist of the pioneering period.[9] Actually, the modern trained specialist is better qualified to acquire this increased knowledge. He is better grounded in the basic sciences. His training includes basic instruction prior to hospital or resident training. He actually performs operations under careful supervision, in contrast to the older method of observation only, by which students used, as Cheever[10] so aptly stated, "to attach themselves to a chief and absorb, as it were by osmosis, some of the essence of his work." The proper approach to the problem was well expressed by Gallie,[5] who said: "The truth is that in modern first class teaching hospitals, the diagnosis should be made, the type of treatment selected and operation performed by the resident staff under the constant guidance and supervision of their teachers. The attending staff should reserve for itself only special groups of cases which obviously require more experience and skill than the assistant residents have so far acquired." In doing the various procedures expected of thoroughly trained otolaryngologists, the resident will encounter the pitfalls that only long and arduous experience might otherwise offer him. In personally following through medical and surgical procedures, he gains the necessary confidence to carry on in the future as a head and neck specialist. As Pasteur so appropriately said, "In the fields of observation, chance favors only the mind which is prepared."

SUMMARY

1. Modern otolaryngology is a specialty that has gradually but surely progressed from a primitive beginning to standards of high scientific attainment.

2. The scope of the specialty was broadened and will continue to broaden as medicine and surgery continue to make the rapid strides they have made in the past half century.

3. Modern otolaryngology, with its broadened scope, has no time for "piddlers." Those who contemplate entering the field must have a broad education; they must be prepared to equip themselves by long training and experience to serve mankind in accordance with modern concepts of medicine and surgery.

RÉSUMÉ

1. L'otorhinolaryngologie moderne est une spécialité qui a progressée graduellement mais sûrement, ayant acquis, après des débuts très simples, une valeur scientifique particulièrement élevée.

2. L'horizon de la spécialité s'est élargi et il continuera à s'amplifier tout autant que la médecine et la chirurgie continueront à avancer à grands pas ainsi qu'ils ont fait au cours de la dernière moitié du siècle dernier.

3. L'otorhinolargyngologie moderne avec ces horizons élargis n'est pas pour les amateurs. Ceux qui ont l'intention d'entreprendre cette carrière doivent avoir un bagage scientifique sérieux; ils doivent se préparer par de longues études et par la pratique pour pouvoir rendre service à l'humanité selon la conception moderne de la médecine et de la chirurgie.

RESUMEN

1. La Otorinolaringología moderna es una specialidad que de un modo lento, pero ininterrumpido, ha progresado desde sus comienzos primitivos, hasta alcanzar un nivel de gran altura científica.

2. El horizonte de esta especialidad se ha ensanchado y sigue haciéndolo aún, a medida que la Medicina y la Cirugía continúan avanzando del modo rápido como lo han hecho en los últimos cincuenta años.

3. La Otorrinolaringología moderna. al haber ampliado su campo no tiene cabida para los que simplemente se asoman a "curiosear". Aquellos que piensan entrar en este campo. deben tener una amplia base cultural y estar preparados para educarse a sí mismos mediante un largo período de adiestramiento y

experiencia con el objeto de poder servir a la humanidad utilizando las conquistas modernas de la Medicina y la Cirugía

RIASSUNTO

1) L'otolaringologia moderna e' una specialita' che ha continuamente progredito, in modo da raggiungere un alto livello scentifico

2) Gli scopi e le mete della specialita' si sono notevolmente ampliate in rapporto ai rapidi progressi della medicina e della chirurgia negli ultimi decenni

3) Questa specialita non si presta agli indolenti Coloro che la prescelgono, debbono avere una profonda cultura debbono essere preparati ad una lunga e faticosa esperienza onde servire l'umanita' in base ai postulati della medicina moderna

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Forthcoming Assemblies

The Annual Assembly of the Indian Chapter, International College of Surgeons, will be held in Bombay on September 28, 29 and 30, under the leadership of Mr R N Cooper, President, and Dr V P Mehta, Secretary All members of the College are cordially invited to attend Details of the meeting may be obtained by writing to Dr V P Mehta, 114, Church Gate, Reclamation, Bombay 1, India, or to the International Secretary General, 1516 Lake Shore Drive, Chicago 10, Illinois

The International Anatomical Congress will be held at Oxford, England, July 25 28 The program includes general anatomy, histology, embryology, morphogenics, endocrinology, neurology and physical anthropology Headquarters of the congress is at the Department of Human Anatomy, University Museum, Oxford, and is in charge of Professor W E Le Gros Clark, F R S

The Second Argentine Congress of Radiology will be held in Tucuman, Argentina, from May 27 through the 31st, under the auspices of the Argentine Association of Radiology A cordial invitation is extended to all who are interested Those desiring to attend the meeting may contact Dr Lidio G Mosca, President of the Second Argentine Congress of Radiology, Avenida Gral Paz, 151, Cordoba, Argentina

Recent Trends in Esophageal Surgery

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CHICAGO

IN THE past decade surgery of the esophagus has made tremendous strides, not only in the field of carcinoma but also in the numerous other conditions which this organ is heir to. Diseases of the esophagus fall not only into the realm of the surgeon but into that of the general practitioner, the internist, the pediatrician, the anesthetist, the roentgenologist and the otorhinolaryngolist as well. It is for this reason that a presentation dealing with this subject is timely.

ANATOMIC CONSIDERATIONS

Some points in the surgical anatomy of the esophagus bear emphasis (Fig. 1). It is well to remember that the esophagus per se is 10 inches (25 cm.) in length, extending from the sixth cervical vertebra (cricoid cartilage level) to the tenth dorsal vertebra (esophageal hiatus level). The esophagologist, however, does not measure from the sixth cervical vertebra but rather from the alveolar margin, which adds an additional 6 inches (15 cm.) to its actual length; thus he bases his report upon a 16-inch (40-cm.) structure.

The esophagus has three normal curves and three physiologic constrictions. Its three curves or flexures are placed in the following manner: in the neck it curves to the left, as it descends in the thorax it curves to the right, and as it approaches the esophageal hiatus it curves again to the left. These flexures are of practical importance, since they may determine the proper side of approach. The three physiologic constrictions are located (1) at the level of the cricoid cartilage (sixth cervical level), (2) at the arch of the aorta and (3) at the esophageal hiatus. It is at these constrictions that the greatest amount of irritation takes place and the greater number of pathologic lesions are observed. Most foreign bodies are impeded in their path downward at the first physiologic constriction and are therefore found on a level with the sixth cervical vertebra. In locating a swallowed foreign body it is all-important, therefore, to order not only a roentgenogram of the chest but one of the neck as well.

The relation of the vagus nerves to the esophagus should be stressed, since these nerves may be involved or must be sacrificed in some esophageal procedures. Although much has been written recently regarding the anatomy of the vagi and although numerous patterns have been described, in the main it may be stated that the left vagus nerve passes along the anterior aspect of the esophagus, intimately hugs the food pipe and is the smaller of the two vagi. The right vagus passes posteriorly, does not hug the esophagus and is larger.

To know the boundaries of the so-called "esophageal triangle" is to make identification and isolation of the supradiaphragmatic portion of the esophagus a simple and rapid maneuver. This anatomic triangle is bounded in front by the heart, behind by the descending aorta and below by the diaphragm.

Almost every text, monograph or recent article calls attention to the poor blood supply of the esophagus. I cannot agree with this teaching. To emphasize this point one needs only to divide the esophagus into upper (cervical), middle (thoracic) and lower (abdominal) parts. The upper part of the organ is supplied voluminously by the inferior thyroid artery; the middle or thoracic part is supplied by aortic, bronchial and intercostal branches; the lower part is well supplied by the left gastric and the inferior phrenic arteries. In my work I have demonstrated, and also presented in a recent motion picture of the actual procedure, the removal of the entire thoracic esophagus, both supra-aortic and infra-aortic portions, from its mediastinal bed. After this the esophagus was transected at its entrance into the stomach, and brisk, bright red arterial oozing was noted. I feel, therefore, that much more can be expected of the esophagus in its

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Read at the Fourteenth Annual Assembly of the United States Chapter, International College of Surgeons, Atlantic City, November 8, 1949.

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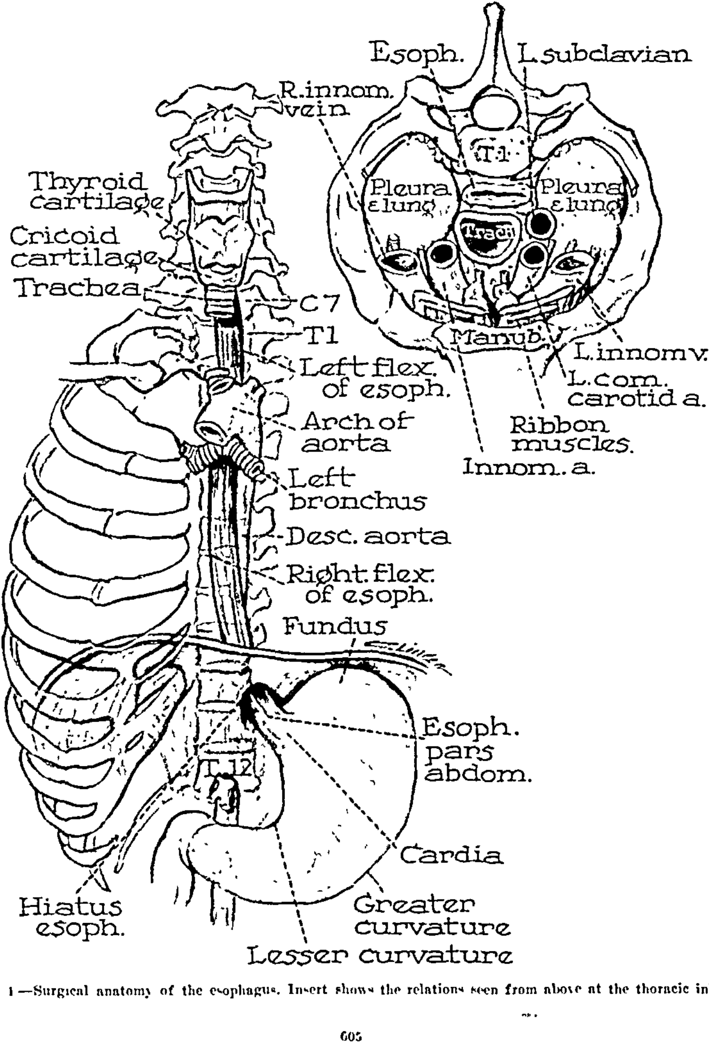


Fig. 1—Surgical anatomy of the esophagus. Insert shows the relations seen from above at the thoracic inlet.

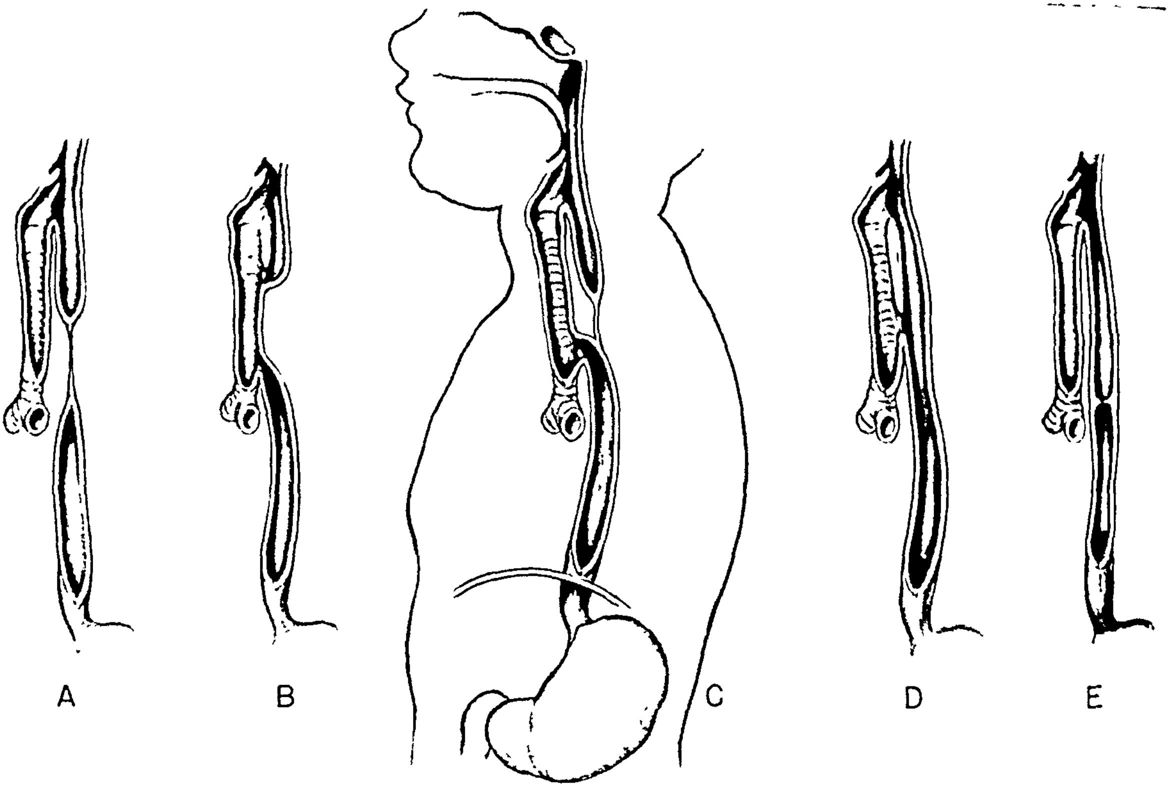


Fig. 2.—Congenital atresias and tracheo-esophageal fistulas. Various combinations of these may occur. The most common combination is that depicted in Figure 2*C*.

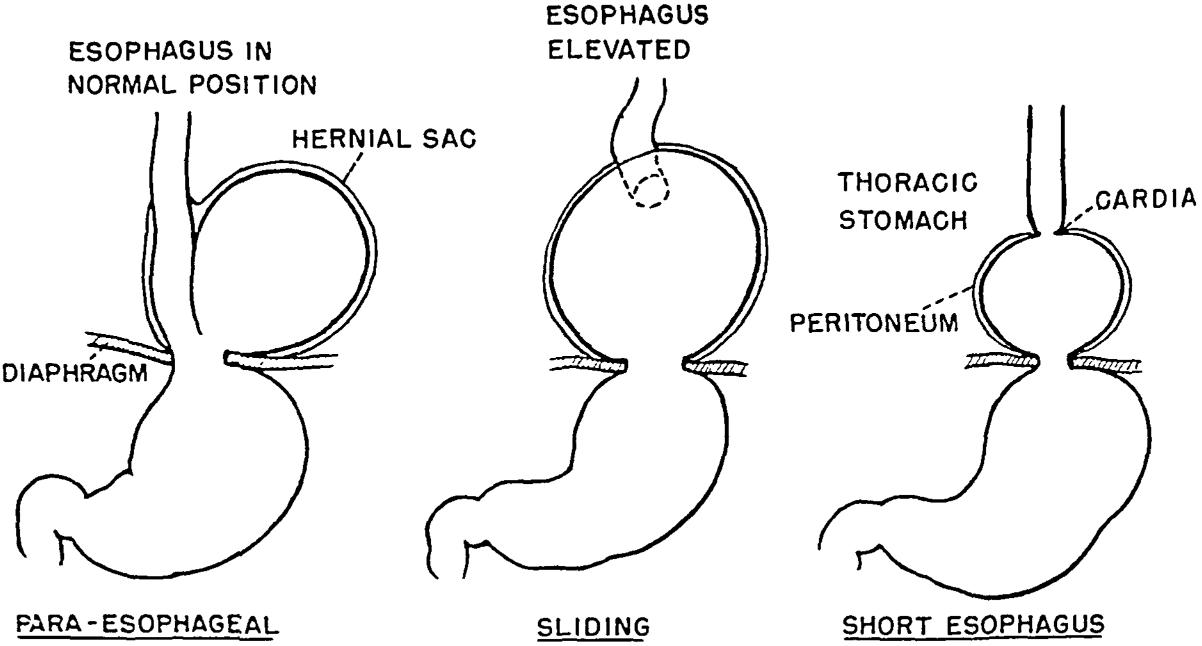


Fig. 3.—The three types of esophageal hiatus hernia.

ability to heal, particularly if careful sutures are placed and if tension is avoided

CONGENITAL DEFECTS

Much has been learned recently about congenital atresias and tracheo-esophageal fistulas so that now they can be properly classified and treated (Fig. 2). Various combinations and degrees of these anomalies are possible The most common such defect is one in which the proximal end of the esophagus terminates as a blind pouch and the distal end joins the trachea to form a tracheo-esophageal fistula (Fig 2 *C*). The other types of defects are depicted in the accompanying illustrations (*A, B, D* and *E*)

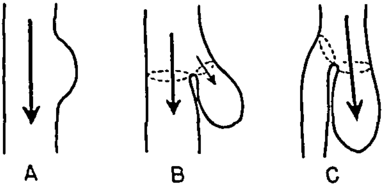


Fig 4 —Pathologic physiology of esophageal diverticula

Such a defect is to be suspected if the newborn baby presents a symptom complex revealing the three "C's", namely, *coughing, choking* and *cyanosis*. Especially is this true if there is an abnormal amount of drooling and rhinorrhea These symptoms should suggest an im-

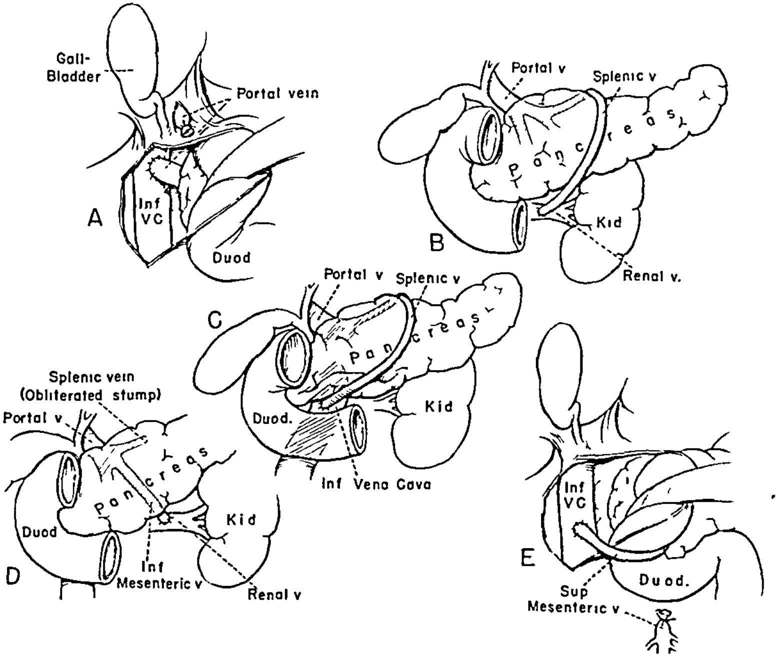


Fig 5 —Various types of portacaval shunt. *A*, end to side portacaval shunt; *B*, splenorenal shunt; *C*, spleno caval shunt; *D*, inferior mesenteric renal shunt; *F*, superior mesenteric caval shunt.

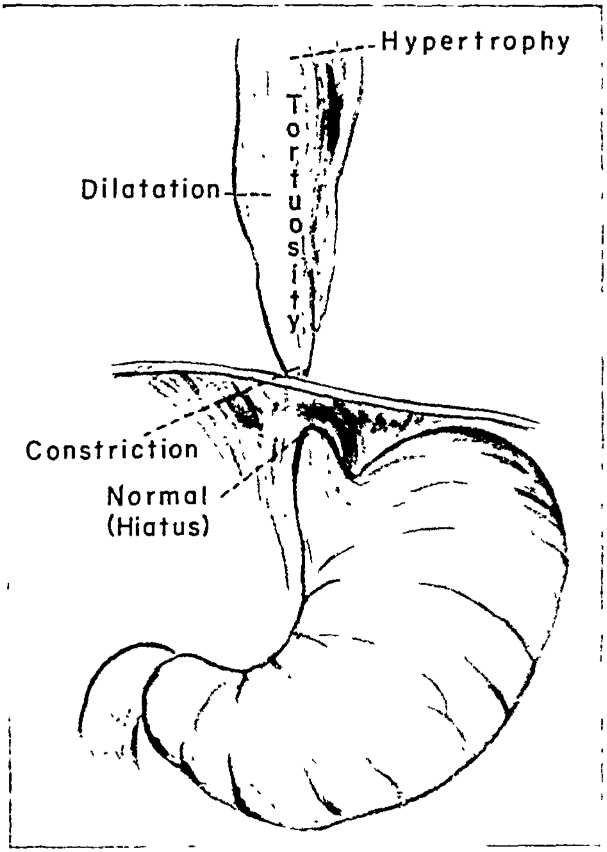


Fig. 6.—Cardiospasm (achalasia) of the esophagus.

pending surgical emergency. The roentgenologist is of inestimable value in determining the type and site of such lesions by merely noting the presence or absence of gas in the stomach and bowel, and by injecting a small amount of lipiodol through a nasal catheter into the proximal portion of the esophagus (barium should never be used).

The side of approach to atretic lesions and tracheo-esophageal fistulas is open to controversy. It is true that if only a small narrow atretic portion in the esophagus exists the right-sided approach is preferable. The reasons for this are that the arch of the aorta does not interfere with exposure, only the azygos vein need be ligated and severed to visualize the esophagus thoroughly, and an end-to-end anastomosis may be accomplished readily. However, if the atresia or the fistula involves a longer segment of esophagus, an end-to-end esophageal anastomosis cannot be accomplished. Thus if one has utilized a left-sided approach it is an easy matter to open the diaphragm, mobilize the stomach, and perform an intrathoracic esophagogastrostomy. It should be remembered also that in the newborn and in the young the aorta is not the barricading impediment that it is in older persons, since in the young it can readily be retracted out of the way.

If a few of these pertinent facts are kept in mind, not every "blue baby" will be thought to present the tetralogy of Fallot, and an immediate and proper work-up will be instituted, thus saving many such children from unnecessary deaths.

HERNIA OF THE ESOPHAGEAL HIATUS

A hernia of the esophageal hiatus is a diaphragmatic hernia in which the upper part of the stomach herniates through the esophageal hiatus. The following three types of esophageal hiatal hernias (Fig. 3) have been described: (1) the para-esophageal type, in which the stomach herniates through the esophageal hiatus and lies parallel to an esophagus of normal length; (2) the sliding type, in which the stomach is herniated through the hiatus but has pushed an esophagus of normal length upward, thus rendering it tortuous, and (3) the hiatal hernia with a congenitally short esophagus, in which the upper part of the stomach is herniated through the hiatus because the esophagus has never *attained its normal length.*

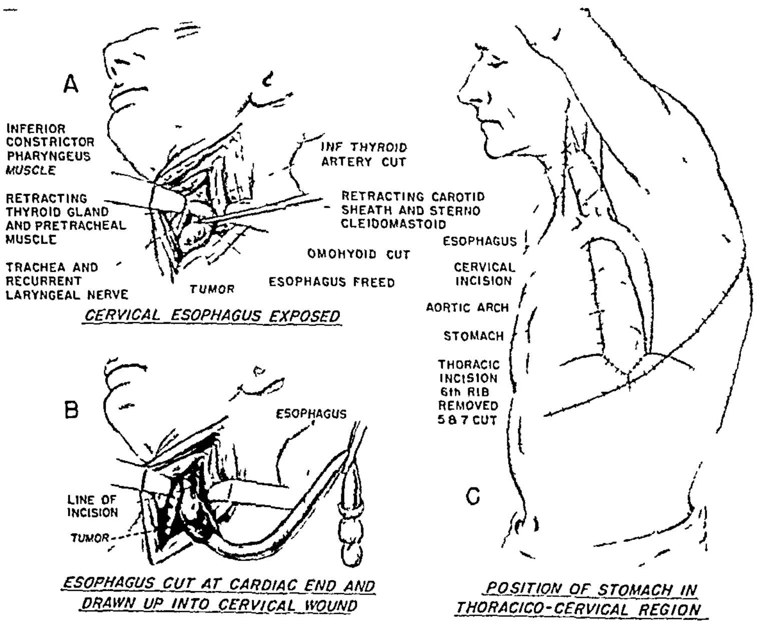
The last-mentioned type can be diagnosed by the esophagologist when he records the appearance of gastric mucosa at an unusually high level, indicating a short esophagus. Hiatal hernias may be observed as a coincidental finding in taking gastrointestinal roentgen films. Such hernias rarely if ever produce symptoms. Although many advocate leaving them alone, the danger of strangulation of such a herniated segment of stomach, with resulting putrid empyema and rapid death, must be kept in mind.

Many patients with hiatal hernias complain of epigastric distress, bloating, belching, anorexia, loss of weight and retrosternal pain. Such cases have been diagnosed erroneously as disease of the gallbladder, peptic ulcer, gastritis or coronary disease. These errors can be avoided if the possibility of hiatal hernia is kept in mind and if roentgen films are taken with the patient in the Trendelenburg position, which would readily demonstrate herniation that might otherwise be overlooked.

The surgical repair of a para-esophageal hernia or a sliding type of hernia is simple since all that is necessary is reduction of the herniated stomach and tightening of the esophageal hiatus. It is the hernia associated with a congenitally short esophagus that presents a problem. For such a lesion I have devised a procedure by which the hiatus is incised and enlarged and the defect increased. This is accomplished by herniating more stomach into the thoracic cavity thus removing the pull on the congenitally foreshortened esophagus. The esophageal hiatus is then loosely sutured around the stomach.

ESOPHAGEAL DIVERTICULA

The time honored classification of diverticula into pulsion and traction types is still of value. Surgically we are interested in the pulsion type of diverticulum which occurs either in the neck (cervical) or immediately above the diaphragm (epiphrenic). The so called traction type is usually located in the region of the tracheal bifurcation where the chronically inflamed tracheal lymph nodes are found. These rarely produce symptoms, since they usually have a wide ostium which forms their neck. However more important than the classification is appreciation of the pathologic physiology which underlies the formation of this condition. It is believed that one of the prerequisites for the pulsion type is a weak



A
INFERIOR CONSTRICTOR PHARYNGEUS MUSCLE
INF THYROID ARTERY CUT
RETRACTING THYROID GLAND AND PRETRACHEAL MUSCLE
RETRACTING CAROTID SHEATH AND STERNO CLEIDOMASTOID
OMOHYOID CUT
TRACHEA AND RECURRENT LARYNGEAL NERVE
TUMOR
ESOPHAGUS FREED
B
ESOPHAGUS
LINE OF INCISION
TUMOR
C
ESOPHAGUS
CERVICAL INCISION
AORTIC ARCH
STOMACH
THORACIC INCISION 6th RIB REMOVED 5 & 7 CUT

CERVICAL ESOPHAGUS EXPOSED

ESOPHAGUS CUT AT CARDIAC END AND DRAWN UP INTO CERVICAL WOUND

POSITION OF STOMACH IN THORACICO-CERVICAL REGION

Fig 7.—Surgical treatment for carcinoma of the cervical portion of the esophagus. Note that in C the stomach has been brought up behind the arch of the aorta.

ness in the muscular wall, which permits herniation of the mucosa through the weak part and results in a diverticulum. No symptoms are produced as long as the opening into the diverticulum is large. However, as food slowly packs into the diverticulum the latter increases in size and drops downward (Fig. 4). This process continues until the weighted sac hangs downward and produces pressure upon the esophagus, obstructing it. It should be noted that in such a far-advanced stage food has easier access to the diverticulum than to the esophageal lumen proper. Dysphagia is the outstanding complaint, and diverticulitis, perforation and mediastinitis are the more common complications.

In this day of chemotherapy, improved surgical technic, modern anesthesia and proper postoperative care, the one-stage diverticulectomy is preferred over the two-stage procedure. Although removal of the diverticulum is preferred, diverticulopexy still has its place. The latter procedure, in which the diverticulum is dissected free and stitched upward to the surrounding structures, is reserved for the poor risk patient with marked symptoms. When this has been done, food does not have access to the downward-hanging diverticulum and thus the symptoms are relieved.

PORTAL HYPERTENSION

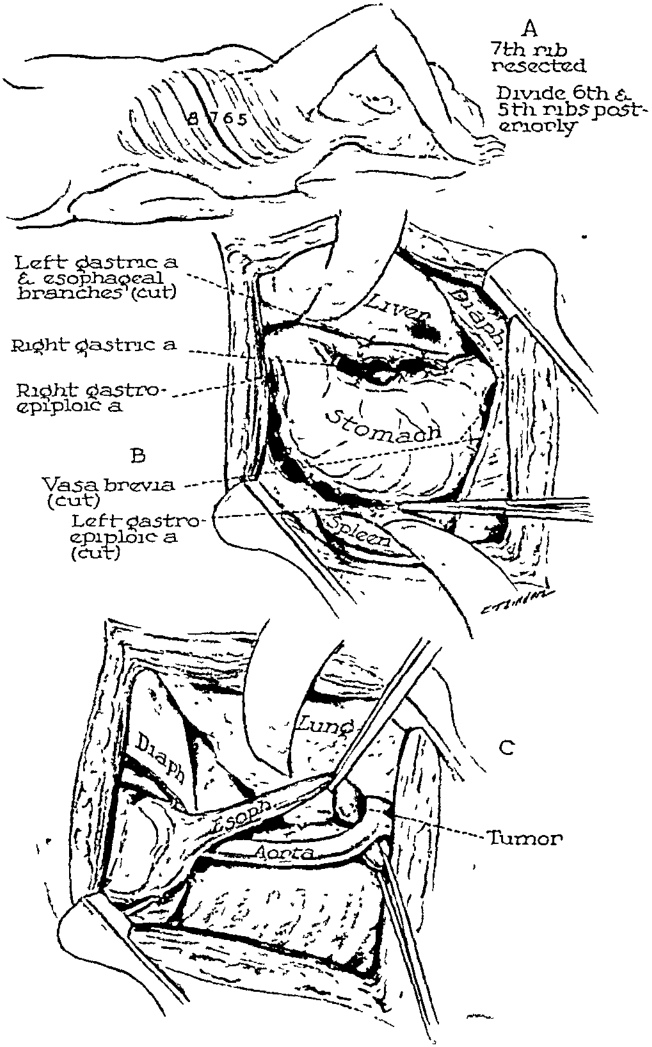
A ruptured esophageal varix presents a true surgical emergency that taxes the diagnostic ability, skill and judgment of the surgeon. This condition results from increased pressure in the portal system and is almost always observed at the lower end of the esophagus (recent studies reveal, however, that varices may occur in any part of the esophagus). Portal hypertension may be due to intrahepatic or extrahepatic causes. The usual condition causing intrahepatic block is cirrhosis of the liver. Extrahepatic block may be due to phlebitis, thrombosis, fibrous stenosis or cavernomatous transformation of the portal vein; it may be congenital or acquired.

One does not refer to Banti's disease in these modern times, but rather to Banti's syndrome. This is characterized by splenomegaly, anemia, esophageal varices, ascites and leukopenia. The syndrome has been produced experimentally by Whipple, who blocked the portal vein. If the block is due to an intrahepatic lesion the liver function tests will give positive results, whereas if the portal block is extrahepatic the results of these tests are usually negative. If the condition is in a quiescent stage it may be safe to take an esophagram, which will reveal the pathognomonic "beaded" appearance at the lower end of the esophagus.

Since hemorrhage from a ruptured esophageal varix may be fatal, definite measures must be taken to prevent recurrence. Some of the therapeutic procedures advocated are injection of the varix with sclerosing agents, tamponade with oxycel or gelfoam through the esophagoscope, ligation of the coronary vein, esophagogastric resection to remove the "pile-bearing" area, and various forms of portacaval shunts.

Portacaval shunts have attained a certain degree of popularity in the past few years, and various types of anastomoses have been attempted in order to shunt the blood from the portal to the caval system (Fig. 5). It is my opinion that, rather than the time-honored end-to-side portacaval shunt (Eck fistula), a lateral anastomosis between the portal vein and the inferior vena cava will prove to be the method of choice. This is accomplished best through a right thoracolaparotomy incision in which the costal arch is divided, making it possible to dislocate the right lobe of the liver into the right thoracic cavity. When this approach is used, the portal vein and the inferior vena cava practically approximate themselves,

Fig. 8.—Surgical treatment for carcinoma of the midthoracic portion (Zone 2) of the esophagus. *A*, the patient is placed on his right side with the left arm held forward and the left side of the chest arched upward. The incision begins at the left costal margin anteriorly, extends backward usually over the seventh rib, and ends by extending upward between the spinal column and the left scapula. A wide resection of the rib is accomplished by cutting its cartilage anteriorly and its neck posteriorly. *B*, the diaphragm has been divided and the lower end of the esophagus and the greater part of the stomach mobilized. *C*, the tumor and the esophagus are freed both above and below the arch of the aorta. (Courtesy of *Illinois Medical Journal.*)


A
7th rib resected
Divide 6th & 5th ribs posteriorly
8 7 6 5
Left gastric a & esophageal branches (cut)
Right gastric a
Right gastro-epiploic a
B
Vasa brevia (cut)
Left gastro-epiploic a (cut)
Liver
Diaph.
Stomach
Spleen
C
Lung
Diaph
Esoph.
Aorta
Tumor

thus avoiding the necessity of dissecting out the common duct and the hepatic artery. It seems preferable also to permit some portal blood to continue through the liver rather than make a complete division of the portal vein. Only time will tell the efficacy of these measures.

CARDIOSPASM (ACHALASIA) OF THE ESOPHAGUS

Cardiospasm is a condition in which there is dilatation, hypertrophy and tortuosity of the esophagus unassociated with an obstructed esophageal hiatus (Fig. 6). Theories as to its production are numerous and will not be discussed here. This condition is twice as common in females as in males, and in a rather large percentage of cases a history of emotional strain or psychic trauma can be elicited.

The outstanding symptoms are dysphagia, regurgitation and pain. Complete esophageal obstruction for varying periods has been noted, even to a point where the patient cannot swallow his own saliva. The pain is usually retrosternal and varies from mild to severe. Morphine addiction has resulted from this condition.

The roentgen film is of particular help in diagnosing cardiospasm. Recently Kramer and Ingelfinger described the mecholyl test as an aid to the diagnosis of cardiospasm. When mecholyl, a parasympathomimetic drug, is injected into a normal person there is only a slight increase in tone and magnitude of esophageal contractions However, in patients with cardiospasm, marked esophageal spasm and contractions follow administration of the drug. Complications that may be associated with the condition are bronchitis, bronchiectasis and pulmonary abscess. All of these may result from aspirated material regurgitated from the esophagus.

Medical management includes psychotherapy, antispasmodics and dilatation. Surgically many types of procedures have been advised, which include cardioplasties, cardiomyotomies, resections and anastomoses

CARCINOMA OF THE ESOPHAGUS

No longer is a defeatist attitude assumed in cases of carcinoma of the esophagus. What was considered a hopeless and inoperable condition only a decade ago presents at least a worthwhile challenge to the surgeon of today. If present impressions are correct, the overall outlook and prognosis for the patient with carcinoma of the esophagus is better than the 5 per cent, five-year "cure" for carcinoma of the stomach.

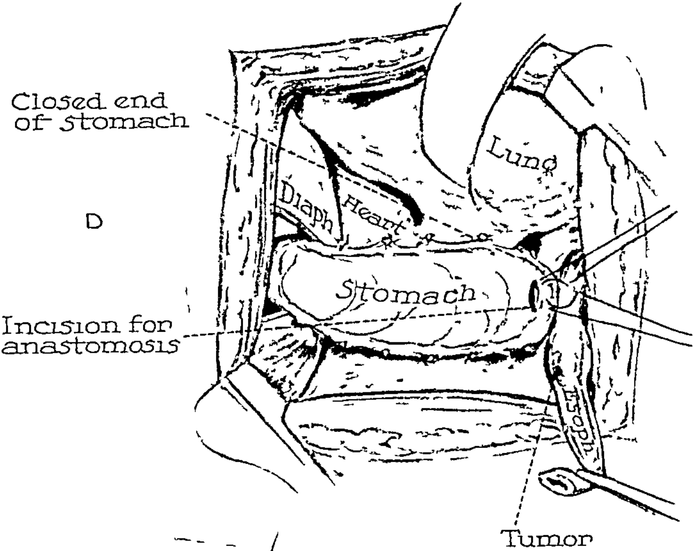
It is of practical value to divide the esophagus into zones. Many such divisions have been described. One that has served me well divides the organ into three zones, namely, an upper (Zone 1), which extends from the beginning of the cervical esophagus to the manubrium sterni; a middle (Zone 2), which extends from the manubrium sterni to the inferior pulmonary ligament, and a lower (Zone 3) from the inferior pulmonary ligament to the esophagogastric junction.

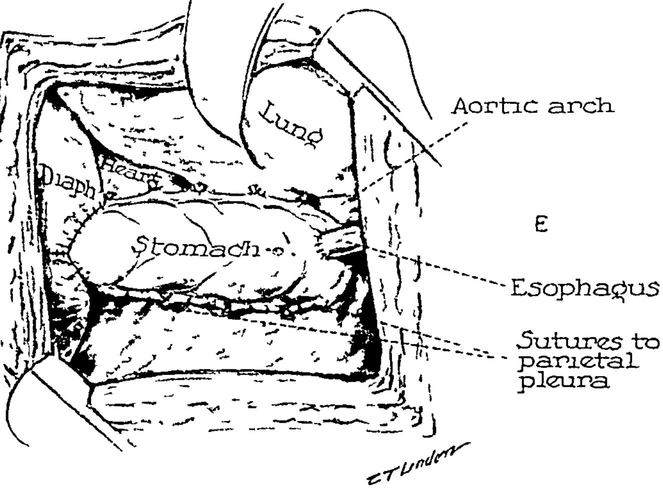
Early diagnosis is of paramount importance in cases of this type of carcinoma, since it is by this means that the survival rate can be increased. One often hears mention of a "change in stool habit" as a probable symptom of carcinoma in the lower intestinal tract; in like manner it may be stated that "any persistent change in the swallowing habit is an indication of carcinoma of the esophagus until proved otherwise." Were this dictum to be heeded and such cases further investigated by means of esophagoscopic and roentgen study, then many esophageal neoplasms would be operated upon earlier.

TREATMENT

Needless to say, preoperative and postoperative therapy for these patients is of the utmost

Fig. 8. Surgical treatment for carcinoma of the midthoracic portion (Zone 2) of the esophagus (cont'd.) *D*, the stomach has been divided distal to the cardia and the gastric opening closed by two layers of sutures. The esophagus is brought over the arch of the aorta. The muscularis of the esophagus is approximated to the serosa of the stomach. An opening is made high on the gastric fundus. The tumor and the major portion of the esophagus are removed and the anastomosis completed. *E*, the diaphragm is repaired. To relieve tension upon the [illegible] is sutured to the parietal pleura and the edges of the diaphragm are fastened to the gastric antrum. (Courtesy of *Illinois Medical Journal.*)


Closed end of Stomach
Lung
D
Diaph
Heart
Stomach
Incision for anastomosis
Esoph
Tumor


Lung
Aortic arch
Diaph
Heart
Stomach
E
Esophagus
Sutures to parietal pleura
C T Linden

importance, and much has already been written concerning these phases.

For *lesions* located in *Zone 1* the Wookey procedure has been used, especially for a tumor situated in the cervical portion of the esophagus. Recently, however, lesions involving the superior mediastinal segment of the esophagus as well as the cervical part have been approached by a more radical procedure, which removes the thoracic portion of the esophagus and most of the cervical portion (Fig. 7). This is accomplished through a thoracic phase of the operation and a cervical phase. The operation is completed by an intracervical end-to-side esophagogastrostomy. In placing the mobilized stomach in the neck the surgeon may find that the thoracic inlet impinges upon the stomach. If this is the case it may be necessary to remove the inner half of the clavicle and the first rib. Whether the mobilized stomach should be placed behind or in front of the arch of the aorta is a moot question and must be decided by the surgeon at the time of operation.

Lesions of Zone 2, or those which involve most of the thoracic portion of the esophagus, are removed by a rather standardized procedure in which a wide esophageal resection is accomplished, followed by an end-to-side supra-aortic esophagogastrostomy or esophagojejunostomy (Fig. 8). When the jejunum is used it may be necessary to do a Roux "Y" anastomosis or some modification thereof.

Lesions of Zone 3 include not only the lower end of the esophagus but the gastric cardia as well. I prefer a thoracolaparotomy incision in which a left rectus incision extends across the left costal arch, dividing it and then continuing into the eighth intercostal interspace (Fig. 9). The diaphragm is divided to and through the esophageal hiatus, and the esophagus is mobilized from the aortic arch to its entrance into the stomach; the latter is then mobilized to the pylorus. The right gastric and gastroepiploic arteries should be left intact. An esophagogastric resection is then accomplished and is followed by an end-to-side esophagogastrostomy. If necessary the spleen and part of the pancreas are removed.

In most of my esophageal operations water seal drainage is preferred, and a Levine intragastric tube is permitted to remain in place for the first three postoperative days. I cannot subscribe to the teaching that these tubes may be harmful. Routine portable roentgenograms are taken twenty-four hours after operation to determine the pulmonary status.

PALLIATIVE PROCEDURES

Although the primary lesion may be extensive or may even show distant metastases, it is always worth while to attempt a palliative resection, thereby improving the patient's general condition and sense of well being. This is explained by the fact that infection is reduced and anemia is corrected. In the event that it is impossible to remove the primary growth, some short-circuiting procedure, such as an esophagogastrostomy or an esophagojejunostomy may make the patient's remaining days more comfortable.

RUPTURE OF THE ESOPHAGUS

Both spontaneous and traumatic rupture of the esophagus have been described in the literature. A spontaneous rupture is an interesting lesion and is not so extremely rare as it was formerly thought to be. If one has the condition in mind it should be possible to diagnose it preoperatively. It is found most frequently in male patients who are victims of alcoholism, and is associated with a preliminary severe bout of vomiting; this is followed by agonizing pain, which may be either thoracic or abdominal. The patient usually goes into rapid and profound shock. This condition cannot be confused with a ruptured peptic (gastric or duodenal) ulcer, since with the ruptured ulcer the pain appears first and is followed by vomiting, whereas with the spontaneous rupture vomiting comes first and is followed by pain. The ruptured esophagus is associated frequently with surgical emphysema, which can be felt in the neck. Whenever such emphysema is noted one should think immediately of spontaneous esophageal perforation and verify this with a flat roentgen film, which will reveal a spontaneous hydropneumothorax. Aspiration of the chest has been done in some cases, resulting in the discovery of food particles or vomitus. Formerly the mortality was thought to be 100 per cent; however, with early diagnosis and modern surgical therapy the outlook is much better today, and some patients are definitely being saved.

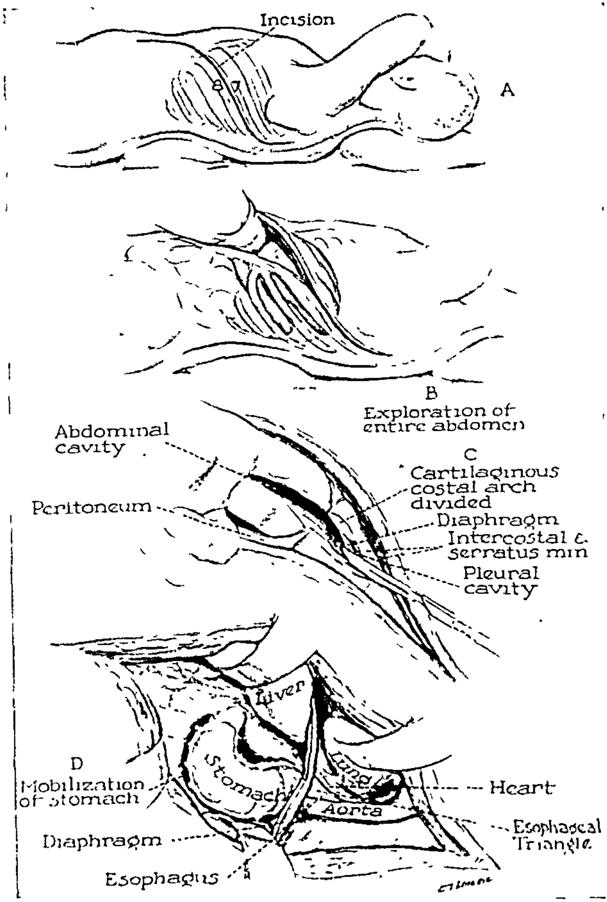


Fig. 9.— Surgical treatment for carcinoma of the lower end of the esophagus and upper end of the stomach (Zone 3). *A*, the patient is placed on his right side with a 5 degree inclination backward. The incision extends from 1 or 2 inches (2.5 to 5 cm.) below the umbilicus, over the inner third of the left rectus abdominis muscle, crosses the left costal arch, continues in the seventh intercostal interspace and then turns upward between the left scapula and vertebral column. *B*, the abdominal part of the incision is opened and thorough exploration is carried out to determine operability. *C*, the costal arch is severed, the intercostal muscles and pleura are divided and the pleural cavity is entered. The diaphragm is divided radially from the esophageal hiatus to its peripheral attachment. *D*, thoracico abdominal exposure and identification of the esophageal triangle. (Courtesy of *Illinois Medical Journal.*)

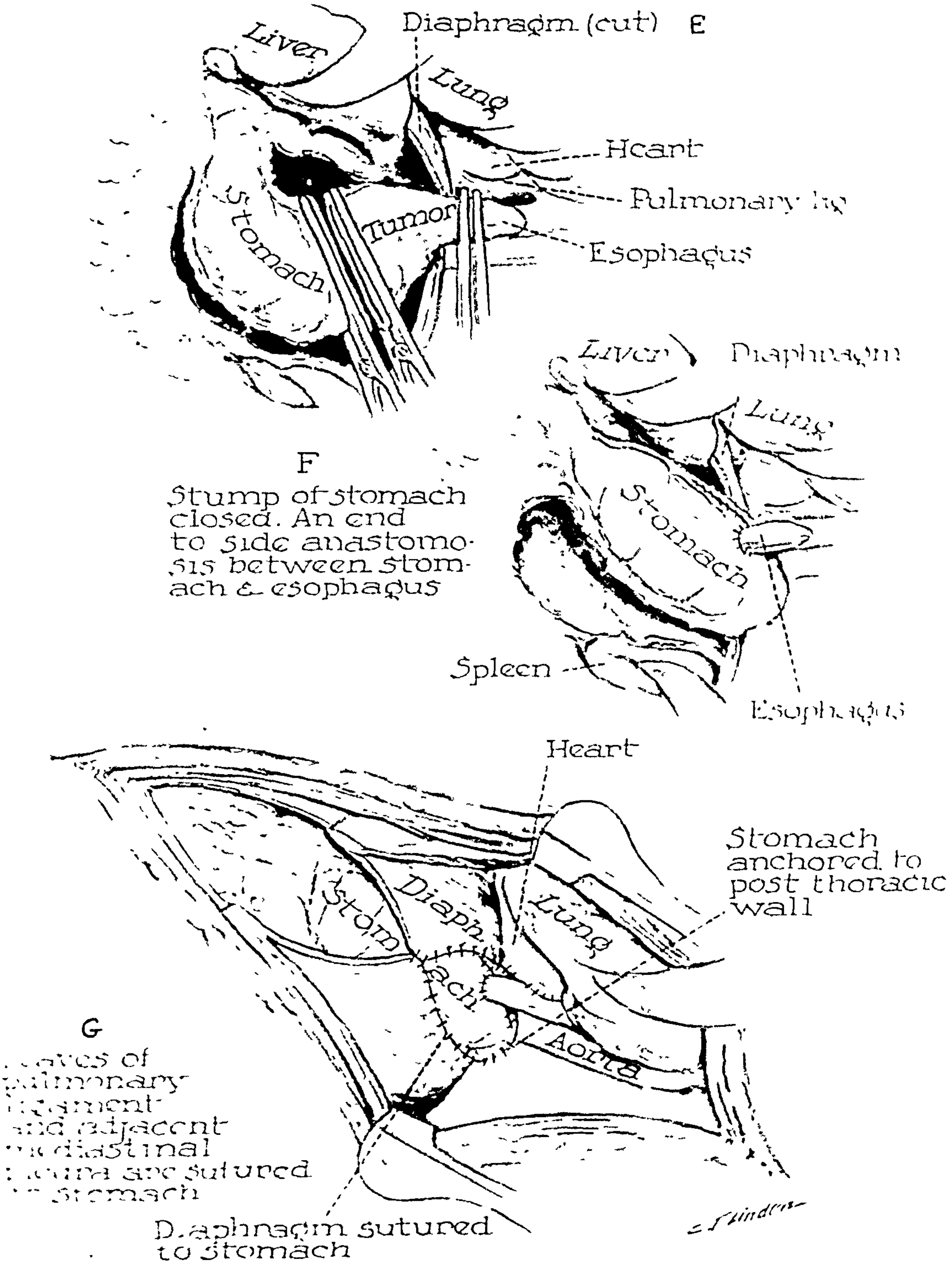

Liver
Diaphragm (cut)
E
Lung
Heart
Pulmonary lig
Stomach
Tumor
Esophagus
Liver
Diaphragm
Lung
F
Stump of stomach closed. An end to side anastomosis between stomach & esophagus
Stomach
Spleen
Esophagus
Heart
Stomach anchored to post thoracic wall
Stomach
Diaph.
Lung
Aorta
G
Leaves of pulmonary ligament and adjacent mediastinal pleura are sutured to stomach
Diaphragm sutured to stomach
Linden

Fig. 9.—Surgical treatment for carcinoma of the lower end of the esophagus and upper end of the stomach (Zone 3), continued. *E*, removal of the tumor, including the lower end of the esophagus and the upper end of the stomach. *F*, supradiaphragmatic esophagogastrostomy completed. *G*, repair of the diaphragm and prevention of tension on the suture line by suturing the stomach to the diaphragm, the thoracic wall and the adjacent mediastinal pleura. (Courtesy of *Illinois Medical Journal.*)

MEDIASTINITIS

Perforation of the esophagus may result in a serious condition mediastinitis Malignant tumors or foreign bodies are the two main causes of perforation Since carcinoma develops gradually it does not give rise to as extensive an infection of the mediastinum as do other lesions

Perforations caused by foreign bodies are of more practical importance At present it is felt that mediastinal infections which extend *deeper than the fourth or the fifth thoracic vertebra cannot* be adequately drained by means of cervical mediastinotomy and must be treated by posterior mediastinotomy Chemotherapy is an all important adjunct for this type of infection

BENIGN TUMORS

Benign tumors of many types have been found in the esophagus the most common of which are lipomas and myomas Owing to the constant effect of swallowing, such tumors have a tendency to become tremendously elongated and pedunculated They have been known to be coughed up and to appear in the patient's mouth If this occurs it may be possible to remove the lesion by means of a snare passed orally If the tumor, however, is lower down esophagotomy with removal of the tumor and primary closure of the esophagus is the treatment of choice

In a presentation of this type it is impossible to mention every aspect of *esophageal pathology* Only the more common and frequent conditions have been stressed The esophagus has been just as much of a "hermit" as the pancreas, however recently it has been brought within reach of the well equipped and well trained surgical team That this organ is accessible to modern diagnostic and therapeutic procedures is due to the efforts of such men as Franz Torek, Sauerbruch, Garlock, Sweet Nissen and others too numerous to mention Their contributions have enabled the modern surgeon to save many lives that were doomed a decade ago Today the future for esophageal surgery is most promising

SUMMARY

The more common pathologic conditions which affect the esophagus have been discussed and their treatments have been evaluated The importance of physiopathology as an aid to early diagnosis has been stressed

Since the advent of improved diagnostic methods modern anesthesiology chemotherapy skillful surgical technic and proper preoperative and postoperative care the esophagus has been brought into the realm of surgical safety

RESUME

Les possibilités d'opérer l'oesophage ont fait de gros progrès depuis que le chirurgien a eu à sa portée les techniques chirurgicales modernes L'on guérit tous les jours des lésions que l'on considérait jadis inopérables et désespérées et les symptômes dus à des lesions vraiment inopérables sont amendés d'une façon remarquable et sans précédents

Parmi les conditions pathologiques de l'oesophage l'on décrit les défauts congénitaux la hernie de l'hiatus les diverticules le cardiospasme, l'hypertension portale le carcinome la rupture, les tumeurs bénignes et la médiastinite L'auteur donne les grandes lignes de sa thérapeutique pour chacun de ces cas *et base sa méthode* sur les *rapports anatomo* physiologiques de l'oesophage divisant cet organe en trois parties Zone 1 la partie cervicale ou supérieure, Zone 2 la partie thoracique ou médiane et Zone 3, la partie abdominale ou inférieure

Un paragraphe décrit les procédés palliatifs L'importance du diagnostic précoce est soulignée

RESUMEN

El adelanto de la ciencia y la técnica quirurgicas ha modernizado e incrementado grandemente la accesibilidad del esófago al tratamiento quirurgico Las lesiones que antaño se consideraban inoperables y sin posibilidad de curacion, pueden curarse en la actualidad, y los síntomas incurables debidos a las mismas pueden aliviarse hasta un grado verdaderamente sin precedente

Entre los trastornos patologicos del esofago *examinados por el autor* figuran las trastornos congenitos hernias del hiato diverticulo cardioespasmo hipertensión portal carcinoma

ruptura, tumores benignos y mediastínitis. El autor esboza el tratamiento de cada uno de ellos basado en las relaciones anátomofisiológicas del esófago y en la división de dicho órgano en tres zonas: 1. zona cervical; 2. zona media (torácica), y 3. zona inferior o abdominal.

Se incluye una sección dedicada a los tratamientos paliativos, prestándose gran atención a la importancia del diagnóstico precoz.

RIASSUNTO

La possibilita' di interventi chirurgici sopra l'esofago e' stata notevolmente favorita dai progressi realizzati nella tecnica operativa. Lesioni dell'esofago che apparivano nel passato inoperabili, incurabili, possono essere oggi guarite, mentre la cura palliativa di lesioni effettivamente incurabili ha raggiunto un' efficacia insperata.

Fra le tante lesioni, l'A. discute le anomalie congenite, l'ernia, i diverticoli, il cardiospasmo, l'ipertensione della vena porta, i carcinomi, la rottura, i tumori benigni e la mediastinite. Delinea inoltre la cura operativa seguita in ognuna di queste lesioni, basandosi sopra i rapporti anatomo-fisiologici e la divisione dell'esofago in tre porzioni: 1) la superiore (cervicale); 2) la media (toracica; 3) l'inferiore (addominale).

Accenna anche ai metodi palliativi. Richiama ancora una volta l'attenzione sopra la necessita' di una diagnosi precoce.

The United States Chapter of the International College of Surgeons

announces the creation of Junior Membership in the College. The House of Delegates, meeting on Dec. 18. 1949, established this new form of membership, with the following requirements:

One year of internship in an approved hospital

One year as resident surgeon in a specific surgical training program

Applicants must be between 25 and 30 years of age. For further information, address

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Hypertension Treated by Subtotal Bilateral Adrenalectomy

JOSEPH L. DeCOURCY, M.D., F.A.C.S., F.I.C.S.
CINCINNATI

MORE than a decade ago, in my earlier studies appraising subtotal bilateral adrenalectomy in the treatment of hypertension ("essential hypertension"), I was able to state: "Adrenalectomy for hypertension in properly selected cases has produced excellent results in our hands. We may even look forward with a considerable measure of confidence to eventually controlling, or wholly eradicating, many cases of hypertension which now go unrelieved to an early end. It is to be hoped that clinicians generally will give these surgical methods (sympathectomy and adrenalectomy) consideration and practical trial, for it is only in this way that we may amass sufficient data to confirm or invalidate our conclusions."[1]

Thus, in view of my own observations, as well as those reported in the literature, I have long maintained that subtotal bilateral adrenalectomy rather than sympathectomy affords the means to true progress in the surgical treatment of hypertension. Confirmation of this belief has been forthcoming from a review of the results in patients treated at the De Courcy Clinic during more than twelve years and from recent studies, both experimental and clinical, which present new observations, facts and theories.[2]

Employing the operative procedures earlier described in detail,[3] our clinic has now a series of more than 30 cases in which subtotal bilateral adrenalectomy was performed in two stages, the interval between stages being three months. There has been no mortality from the procedure. After adrenalectomy in carefully selected cases of hypertension, subjective symptoms have disappeared promptly. This improvement has been permanent. Even in some of our early patients, who were far advanced in arteriosclerosis and concomitant pathologic changes, there occurred after adrenalectomy a sense of well being, a gain in weight, and absence of dyspnea and headaches—although in a few patients, after the operation, the blood pressure rose toward its former level.

In more than 75 per cent of the cases of hypertension treated by two stage subtotal bilateral adrenalectomy the blood pressure has been significantly reduced. In a few cases it has returned to normal and has remained normal over a period of years. We now have patients under observation for twelve years with no return of hypertension.

Our favorable results, we believe, may be attributed largely to two factors: (1) careful selection of patients and (2) removal of approximately four fifths of each gland—that is, the removal of about 8 Gm. of adrenal tissue at each of the two stages of the operation (the normal gland weighs about 10 Gm.). It has been well demonstrated that the removal of this seemingly large amount of pheochrome tissue is well within the limits of safety for the patient. Most surgeons have removed only one half of each adrenal—"bilateral hemiadrenalectomy" (Neuhof[2c]).

Confirmatory results have recently been reported by Neuhof, who commented: "The uncertain results obtained by sympathectomy in severe hypertension raise the question of the addition of unilateral or even bilateral hemiadrenalectomy in cases short of the most severe forms of hypertension. Finally, the influence of bilateral hemiadrenalectomy on blood pressure appears to be so salutary as well as distinctive that the question of employing the procedure alone for hypertension naturally arises. Theoretically, at any rate, subtotal adrenalectomy for hypertension appears to parallel subtotal thyroidectomy for Graves' disease."

The generally unsatisfactory results following sympathectomy in the treatment of hypertension have been emphasized by an increasing number of clinicians. The conclusions of Davis, Lindberg and Treger[2a] may be regarded as typical: "Sympathectomy alone has not been successful in permanently reducing the blood pressure levels in the high diastolic type of hypertension regardless of the extent of the operation." Davis and his associates found that, in some cases in which there was preoperative resistance to thiocyanate therapy, sympathectomy caused the patient to become sensitive to this drug. In fact, there was "no significant change in the blood pressure levels or heart size, unless the patients of this group had been given thiocyanates postoperatively."

The rationale behind sympathectomy as a treatment for hypertension has been based upon the concept of overactivity of the sympathetic nervous system as an outstandingly important etiologic factor in this condition. Heinbecker[4] has presented impressive evidence that the primary cause of "essential hypertension" is a humoral mechanism, not overactivity of the sympathetic nervous system. According to Heinbecker, in the pathogenesis of essential hypertension there must, first of all, be a constitutional susceptibility of the hypothalamus to functional depression. Depression of the hypothalamic nuclei innervating the neural hypophysis causes overactivity of the hypophysial eosinophilic cells, and there results a trophic stimulation of the adrenal cortex. And, as Heinbecker stated, "The combined influence of the eosinophil cell-adrenal cortical hormone complex is to constrict the efferent glomerular arterioles of the kidneys, so as to result in a release of renin." Thus, the combined action of three hormones causes hypertension—"and also the arteriolar sclerosis and degeneration associated with it." Epinephrine is a factor in hypertension, because it stimulates the cerebral cortex of the frontal lobes. Hence: "Its decrease by sympathectomy of the adrenal medulla is considered to be the mechanism whereby the production of hormones concerned in the pathogenesis of essential hypertension are decreased. Its decrease is responsible also in large measure for the relief of symptoms of hypertension referable to the nervous system following sympathectomy of the adrenals."

Heinbecker expressed the conviction that "any beneficial effect to be obtained by removal of portions of the sympathetic nervous system in the treatment of essential hypertension is to be obtained when such removal results in a denervation of the adrenals and the kidneys" —which are "the only two organs capable of releasing humors concerned with the pathogenesis and symptomatology of hypertension and whose function can be modified by sympathectomy." Heinbecker therefore concluded:

"The removal of portions of the sympathetic nervous system more extensive than is required for denervation of the adrenals and the kidneys is unnecessary. It can have no influence on the causal mechanism of the essential hypertension. The temporary greater enlargement of the vascular bed effected thereby may cause the shunting of blood from the kidneys sufficient to impair their function, and, through the release of renin, accelerate the degenerative changes in the extrarenal blood vessels."

There is, indeed, considerable evidence that deficiency of renal blood flow results in production of renin by the kidneys and in hypertension (of renal origin[2b]). When extensive sympathectomy is performed, not only may there be direct impairment of blood flow through the kidneys by enlargement of the vascular bed, but the cardiac output may be decreased as well.[5]

The studies of Heinbecker are being accorded increasing attention. Although their final evaluation must wait extensive investigations, it would seem that his emphasis upon the limitations and potentially injurious effects of sympathectomy is well placed. It is also in a high degree noteworthy that the evidence indicating a primary role for the adrenal glands in the pathogenesis of hypertension is steadily growing. It seems possible that not only the medulla but the adrenal cortex is involved.

In short, the rationale for a direct attack upon overstimulated and overactive adrenal tissues—i.e., for subtotal bilateral adrenalectomy—in carefully selected cases of hypertension has been steadily strengthened. This surgical procedure, moreover, appears to be fully justified by the clinical results.

Certain similarities between subtotal bilateral adrenalectomy and subtotal bilateral thyroidectomy have long attracted the interest of this clinic. In both surgical procedures overactive endocrine tissue is removed, to effect a highly beneficial if not vital reduction in hormone production and consequent diminution of physiologic activity. In both hyperthyroidism and hypertension psychosomatic factors are believed to be involved apparently playing primary etiologic roles In the event that symptoms of hypothyroidism develop after thyroidectomy thyroid extract may be prescribed Similarly if there is evidence of adrenal cortical hypofunction following adrenalectomy recourse may be had to cortin therapy At this clinic however we have never found it necessary to use cortex after subtotal bilateral adrenalectomy for hypertension

Just appraisal of the results of subtotal bilateral adrenalectomy will ultimately depend upon clinical observations in comparable groups of patients Classification is of course still far from perfect and some confusion in the interpretation of results may be expected It is obvious that statistics without proper classification of the different types of hypertension mean nothing Many of the favorable results following sympathectomy for essential hypertension as reported in the literature would seem to be in cases of menopausal hypertension in which improvement would naturally occur even in the absence of (or in spite of!) attempted therapy Adrenalectomy is of undoubted benefit in cases in which the eyegrounds and other external manifestations indicate that the hypertensive condition is not far advanced No human however is yet able to foretell which specific patient will be permanently benefited Certainly the eyeground abnormalities are important but we have found that even these are occasionally reversible

When the fundus is normal as it may be even in a patient with very high blood pressure and when tests of renal function show that degenerative changes in the arterioles of the kidney have not rendered operative measures valueless subtotal bilateral adrenalectomy may be indicated provided of course that the characteristic symptoms and the clinical course also justify the surgical procedure The permanent improvement in subjective symptoms however in some cases of advanced arteriosclerosis would seem to merit further consideration It is worth remembering that there is indeed no such entity as ‘essential hypertension a term that merely covers lack of knowledge Nevertheless there is increasing evidence that the adrenal glands may be the key to the problem of surgical therapy and perhaps the key factor in etiology If adrenalectomy is performed on well chosen patients there seems to be no reason to fear the outcome A gratifyingly high percentage of favorable results may be confidently expected

SUMMARY AND CONCLUSIONS

1 Subtotal bilateral adrenalectomy is of undoubted benefit in the treatment of hypertension in properly selected cases

2 Subtotal surgical removal of the adrenal glands is best done as a two stage operation four fifths of each gland being removed with an interval of three months between operations

3 In a series of more than 30 cases of hypertension treated by this surgical procedure there has been no mortality Subjective symptoms have disappeared promptly and this improvement has been permanent In more than 75 per cent of the cases the blood pressure has been significantly reduced In some cases the blood pressure has returned to normal and remained normal over a period of twelve years

4 The evidence indicating a primary role of the adrenal glands in the pathogenesis of hypertension is steadily increasing and the rationale for subtotal bilateral adrenalectomy in carefully selected cases has been correspondingly strengthened

5 This surgical procedure rather than sympathectomy would seem to afford the means to true progress in the surgical treatment of hypertension

RÉSUMÉ ET CONCLUSION

1 La résection subtotale bilatérale de la glande surrénale présente de gros avantages dans la thérapeutique de l hypertension dans des cas bien choisis

2 L ablation chirurgicale subtotale des glandes surrénales devrait être faite de préférence durant une opération en deux stades les quatre cinquièmes de chaque glande étant prélevés avec un intervalle de trois mois entre les deux stades de l opération

3 Il n y a pas eu d issue fatale dans une série de 30 cas d hypertension traités par cette méthode opératoire Les symptômes subjectifs ont disparu rapidement et cette amélioration est demeurée durable Dans plus de 75% des cas la pression sanguine baissa de façon im

portante. Dans quelques cas, la pression sanguine revint à la normale et est demeurée normale pendant une période de douze années.

4. Les faits indiquant le rôle primordial des glandes surrénales dans la pathogénie de l'hypertension augmentent constamment et les bases rationnelles pour la résection subtotale bilatérale de cette glande pour des cas triés avec soin, en sont donc renforcées.

Ce procédé chirurgical, plutôt que la sympatecthectomie parait donc offrir l'espoir de progrès importants dans la thérapeutique chirurgicale de l'hypertension.

RESUMEN Y CONCLUSIONES

1. La adrenalectomía bilateral subtotal es, indudablemente, beneficiosa en el tratamiento de casos seleccionados adecuadamente de hipertensión.

2. La mejor manera de realizar la extirpación quirúrgica subtotal de las glándulas suprarrenales es dividiéndola en dos partes, esto es, extirpando cuatro quintos de la glándula cada vez, y dejando transcurrir un intervalo de tres meses entre las intervenciones.

3. En una serie de más de 30 casos de hipertensión tratados por este procedimiento quirúrgico no se registraron casos de mortalidad. Los síntomas subjetivos desaparecieron rápidamente, y la mejoría fué permanente. En más del 75 por ciento de los casos se redujo notablemente la presión sanguínea. En algunos casos la presión sanguínea retornó a la normalidad, permaneciendo así durante un período de 12 años.

4. Las pruebas indican que la importancia del papel de las glándulas suprarrenales en la patogenia de la hipertensión va en aumento y que se está aconsejando cada vez más la adrenalectomía bilateral subtotal en casos cuidadosamente seleccionados.

5. Este procedimiento quirúrgico, de preferencia a la simpatectomía, ofrece el modo de realizar un verdadero progreso en el tratamiento quirúrgico, de la hipertensión.

RIASSUNTO

1. L'adrenalectomia subtotale bilaterale e' benefica in alcuni casi, bene selezionati, di ipertensione arteriosa.

2. L'operazione va preferibilmente eseguita in due tappe: fra le due operazioni, che asportano ogni volta 4/5 della ghiandola, e' bene lasciare un intervallo di 3 mesi.

3. In 30 casi cosi' operati, non si e' verificato un solo decesso. I sintomi soggettivi sono scomparsi subito: il miglioramento e' persistito indefinitamente. Nel 75% dei casi la pressione del sangue si e' abbassata notevolmente. In alcuni casi la pressione e' ritornata normale ed e' rimasta tale per oltre 12 anni.

4. I dati che comprovano una fondamentale partecipazione della surrenale nella patogenesi dell'ipertensione si vanno rapidamente moltiplicando, giustificando sempre piu' le ragioni per un'adrenalectomia subtotale bilaterale.

5. La cura chirurgica dell'ipertensione sembra quindi destinata a passare dalla simpatectomia all'adrenalectomia. Questo passaggio segna un vero, effettivo progresso.

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The Surgical Aspects of Hematemesis and Melena

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SINCE 1928, when I performed a partial gastrectomy on a young man who appeared to be dying from a bleeding gastric ulcer and death actually ensued in forty eight hours I have adopted the following Creed and preached it for nineteen years The opportunity to practice it was not presented until 1946 My Creed is as follows

Fatal hemorrhages take place from the left gastric artery or from the gastroduodenal artery Where the bleeding is due to a gastric ulcer, the left gastric artery should be ligated near its origin Where the bleeding is due to a duodenal ulcer, one should ligate the gastroduodenal artery if one can find it

A recent case enabled me to put this Creed into use

REPORT OF CASE

B H, a man aged 22 was admitted to the Ministry of Health Emergency Hospital Belfast in June 1946 with a six month history of pain in the lumbar part of the spine Roentgen examination revealed caries of the fourth lumbar body and he was placed on a plaster bed in full lordosis Subsequently a right psoas abscess developed

August 16 1947—Dyspepsia appeared in the form of pain twenty minutes after taking food relieved by ulcer diet and alkalis

September 2 First hematemesis bright red blood 3 hemoglobin 74 per cent

September 9 Blood transfusion (drip) 2 pints (0 9L)

September 10 Milk drip via Ryles tube hemoglobin 94 per cent

September 11 Second hemorrhage 3, blood mixed with milk pulse rate 150

September 12 Hemoglobin, 40 per cent

September 14 Blood transfusion (drip) 1 pint (473 ml)

September 16 Third hematemesis coffee grounds and 31 ounces (85 Gm) blood Seen by me and further medical treatment advised

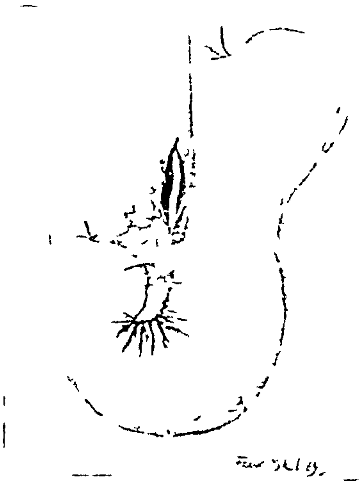
September 22 Hemoglobin 37 per cent

September 23 Fourth hematemesis food and blood mixed, pulse rate 150

September 24 Patient seen by me and operation arranged for following day Pulse rate 120, hemoglobin 30 per cent Blood transfusion (30 drops per minute) started and continued for forty eight hours, before during and after operation

September 25 Operation 4 p m Anesthesia induced with pentothal, nitrous oxide, oxygen, cyclopropane, tubarine hydrochloride 15 mg Right paramedian incision made Stomach revealed

(a) An unusual development of vessels radiating laterally, medially, and downward on the anterior wall of the stomach from a point on the lesser curve, 1 inch (2 5 cm) from the incisura angularis, and on the cardiac side One large leash of vessels descended from this same area on the posterior surface of the stomach and was seen after blunt dissection of an avascular part of the lesser omentum



Artist's representation

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(b) An increased deposit of subperitoneal fat on the aforedescribed portion of the lesser curvature.

(c) No palpable fixation of the lesser curve and no palpable ulcer crater. Some thickening of the lesser curvature in the suspected area.

(d) A duodenum normal to inspection and palpation.

Eight vascular strands were ligated as they radiated from the suspected area, seven on the anterior and one on the posterior surface. These vessels seemed to disappear from view by penetrating the muscular coat. Some of them were veins accompanied by arteries.

The left gastric artery was now sought on the lesser cardiac curvature. An opening was made in the anterior layer of the lesser omentum, and with surgeon's left thumb in this opening and his left forefinger in the bursa omenti minoris, the pulsating artery was palpable. It could be separated from the lesser curvature and was the size of the radial artery. A path around it was made by a dissector, and along this an aneurysm needle was passed. The artery was now ligated with strong silk and the abdomen closed. The operation lasted about half an hour, and the patient appeared to be none the worse for it.

September 26: Blood drip discontinued, six pints (2,836 ml.) having been given. Hemoglobin, 64 per cent; pulse rate, 116.

September 27: Pulse rate, 120. Tongue dry; patient sweating profusely and not drinking well. Intravenous saline drip started.

September 28: Better. Drip discontinued after administration of HL. Vitamin C, 2 mg. daily.

September 29: Patient vomited ʒiii altered blood. Hemoglobin, 30 per cent. Blood drip restarted.

September 30: Drip stopped. Ferrous sulfate started by mouth. Pulse rate 110.

October 2: Pulse rate 88.

October 3: Pulse rate 84. Hemoglobin, 47 per cent.

October 10: Pulse rate 80; hemoglobin 50 per cent; patient feeling well and taking full light diet.

November 6: Hemoglobin 89 per cent; red blood cells, 4,710,000 per cubic millimeter.

Table 1 summarizes cases of hematemesis or melena from the medical wards of the Royal Victoria Hospital, Belfast, between 1937 and 1946.

MEDICAL FATALITIES

[illegible]y-two of these were hopeless from the [illegible] int of view, for one or more of four reasons: (*a*) death on the day of admission or the day after; (*b*) bleeding from a ruptured varicose vein at the lower end of the esophagus, secondary to cirrhosis of the liver; (*c*) advanced age (70 or over), and (*d*) sudden death during what was apparently good progress.

TABLE 1.—*Analysis of Case Records*

Number of cases	307
Medical recoveries	274 (89%)
Medical fatalities	30 (9.7%)
Surgical recoveries	2
Surgical fatalities	1

Eight of these deaths might have been prevented by an operation.

1. William H., 44: Epigastric pain for five weeks. One hemorrhage. Died two weeks after admission. Autopsy revealed ulcer of the lesser curvature with an eroded vessel in its base.
2. Annie C.: Recent hematemesis. Death one week after admission. Autopsy revealed a ½ inch (1.2 cm.) ulcer of the lesser curvature ulcer, 3 inches (7.5 cm.) below the cardia.
3. Woman, 57: Indigestion one week. Hematemesis on day of admission. Melena. Hemoglobin 30 per cent. Death two weeks after admission. No postmortem.
4. Robert S., 65: Indigestion forty years ago. Hematemesis seven years ago. Five recent bleedings, and death on the fifteenth day after admission.
5. John B., 58: Indigestion off and on for eleven years. Pain after food; melena. Two months earlier, treated for duodenal ulcer. Hemoglobin 24 per cent. Death on the nineteenth day after admission. No postmortem, but one suspected bleeding from the gastroduodenal artery.
6. Samuel W., 57: Severe epigastric pain for six weeks. Melena and black vomitus four days before admission. Died on the fifth day. No postmortem, but bleeding from the gastroduodenal artery suspected.
7. James S., 52: Died two weeks after admission for hematemesis. History suggests duodenal ulcer.
8. Man, 50: Ulcer trouble for years. Six recent recurrent hematemeses. Pulse rate 104 or less; hemoglobin, 25 per cent.

MEDICAL RECOVERIES

Twenty five of the 274 medical patients who recovered left the hospital with a pathologic condition of the upper part of the abdomen suitable for surgical treatment. Many physicians take the view, and quite rightly, that if an operation is necessary it should be postponed until the patient has fully recovered from the bleeding. Fifteen of the 25 were suffering from obstruction to gastric outflow from the stomach and would have benefited subsequently by gastroenterostomy, 4 had gallstones, removal of which might have prevented further bleeding, 4 had gastric ulcers suitable for partial gastrectomy, 1 required appendectomy and 1 required thorough examination including laparotomy.

CLINICAL DATA

Duration of Symptoms.—In 164 of the cases, symptoms of stomach trouble had been present for one to thirty years. The symptoms included epigastric pain, vomiting hematemesis or melena.

Tubercular Disease.—Twenty nine of the patients had a history of some tubercular condition—pleurisy, hemoptysis or skeletal disease.

Family History.—A history of "stomach trouble" in near relatives was obtained in 11 cases. This included perforations, pyloric obstruction, gastric ulcer and hematemesis.

Previous Operations.—Twenty one of the patients had a history of previous operation on the stomach. In 9 of these gastroenterostomy had been performed, and in 5 a perforation had been closed. In the remainder the nature of the operation is unknown.

Trauma.—Two patients traced the hematemesis to injury.

Banti's Disease.—This condition accounted for 4 cases, and it is interesting to note that in all 4 the spleen had been removed previously, without stopping the hematemesis.

ROENTGEN DATA

One hundred and sixty eight of the patients were examined by opaque meal and roentgen study, with the following results:

Normal	87
Duodenal ulcer	55
Ulcer of lesser curvature	16
Gallstones	3
Gastroenterostomy	4
Pyloric neoplasm	2
Death	1

Roentgen films are a valuable guide to the source of the bleeding but the patient may be too ill for this examination and the opaque meal may fail to show any ulcer. The absence of a positive roentgen report should not deter the surgeon from operating, as he should be able to rely on the living pathologic picture to distinguish between a gastric and a duodenal ulcer.

DIFFICULTIES IN PROGNOSIS

The following 2 cases illustrate the difficulties in placing or omitting to place a case on the danger list. The first was a case of unexpected recovery. James K., aged 56, had had symptoms for twenty years and hematemesis nineteen years before he was examined here. There were two recent attacks of bleeding, one before admission and one after.

15/9/46—Hemoglobin 21 per cent
16/9/46—Blood transfusion
19/9/46—Blood transfusion
21/9/46—Hemoglobin 18 per cent, pulse rate 124, blood transfusion
24/9/46—Hemoglobin 30 per cent, rapid recovery

The second was a case in which unexpected death took place. Henry H., 53, had had epigastric pain for four months, relieved by food

TABLE 2.—*Analysis of Autopsy Reports in 18 Cases of Fatal Hematemesis**

Male patients	14
Female patients	4
Aged 70 or over	4
Under 40	1
Bleeding from left gastric artery	7
Bleeding from gastroduodenal artery	10
Cancer	1
Tubercular disease of lung or pleurisy	3
Trauma	1
Gastroenterostomy (recent, 2; old, 1)	3
Recent or old perforation	2
Might have been prevented	2
Might have been saved	5

* Autopsies performed in the Pathology Department of the Royal Victoria Hospital, Belfast, from 1937 to 1947.

There had been one attack of melena and hematemesis before admission, but no recurrence. The pulse rate never exceeded 120, nor did the hemoglobin level ever sink below 35 per cent. The patient died two weeks after admission.

GENERAL COMMENT

Worthy of especial note are:

A. The preponderance of males (14 to 4).

B. The patients who might have been saved by ligation of an artery without gastrotomy or gastrectomy (8 of 18).

1. Woman, aged 64: Died on fourth day from left gastric bleeding. Ligation of the left gastric artery might have saved her.
2. Man, aged 59: Died on thirteenth day from gastroduodenal bleeding. Ligation of the gastroduodenal artery plus a gastroenterostomy might have prevented death.
3. Man, aged 67: Died on ninth day after successful gastroenterostomy performed for relief of pyloric hourglass contraction and duodenal ulcer. Death was due to hemorrhage from the duodenal ulcer and might have been prevented by ligating the gastroduodenal artery at time of gastroenterostomy.
4. Man, aged 47: Died nine days after admission, from bleeding duodenal ulcer. Might have been saved by ligation of gastroduodenal artery.
5. Man, aged 47: Died on fourth day from bleeding duodenal ulcer. Might have been saved by ligation of gastroduodenal artery.
6. Man, aged 48: Died from bleeding of the lesser curvature. Suitable case for ligation of left gastric artery.
7. Woman, aged 53: Died on sixth day from a bleeding ulcer of the lesser curvature. Suitable case for ligation of left gastric artery.
8. Man, aged 50: Died on ninth day from bleeding duodenal ulcer. Suitable case for ligation of gastroduodenal artery.

C. Deaths that might have been prevented:

1. Man, aged 50: Duodenal perforation closed six months before hemorrhage. Death two days after admission from bleeding duodenal ulcer. Posterior gastroenterostomy plus ligation of gastroduodenal artery two months after the perforation might have prevented fatal bleeding.
2. Man, aged 33, with a five-year history of severe dyspepsia: Died on second day from a large bleeding pyloric ulcer. An early partial gastrectomy might have prevented the onset of bleeding.

D. Deaths following gastroenterostomy:

1. Death due to peritonitis following gastroenterostomy for relief of bleeding duodenal ulcer.
2. Death from bleeding duodenal ulcer nine days after gastroenterostomy for relief of pyloric hourglass contraction.
3. Gastroenterostomy sixteen years before. Death on day after admission from bleeding duodenal ulcer. Note persistence of duodenal ulcer in presence of a gastroenterostomy.

E. Recent or old perforations of duodenum:

1. Patient with duodenal perforation closed six months before admission. Died on second day from erosion of gastroduodenal artery.
2. Man, aged 69: Died on day after admission from perforated duodenal ulcer, complicated with bleeding from the ulcer.

SUMMARY AND CONCLUSIONS

1. A patient with dangerous recurrent hematemesis was restored to convalescence by ligation of the left gastric artery near its origin.

2. The living pathologic picture disclosed at operation enabled the surgeon to recognize the bleeding area.

3. Hematemesis and melena as treated in the medical wards carry a mortality rate of 9.7 per cent.

4. Of the 30 medical fatalities in a series of 307 cases of hematemesis or melena, 8 might have been prevented by operation.

5. Recognition of the dangerous condition suitable for surgical intervention is a difficult problem, as some patients die who appear to be progressing satisfactorily, and others recover (without operation), who seem to be going steadily downhill. If one rules out the hopeless group—patients over 70, patients who die in the first two days, patients with esophageal varices—one is left with a small group,

who exhibit the following features age under 70, recurrent hematemesis in spite of blood drips, milk drips, and Witts diet, hemoglobin values below 30 per cent, pulse rates persisting around 120 This is the group suitable for ligation

6 As a middle course between medical treatment, pure and simple and gastrectomy, one might suggest Operation Ligature

7 A study of the autopsy reports in 18 cases of fatal bleeding from the stomach or duodenum suggests that in 8 of these cases the condition was suitable for ligation

8 Twenty-five of the 274 medical patients who recovered left the hospital with a pathologic condition of the upper part of the abdomen suitable for surgical treatment at some subsequent date

9 Attention is drawn to the formation of new subperitoneal venous channels in the region of a gastric ulcer The normal routes of venous return are obstructed by thrombosis and the new diversion routes are a guide to the surgeon

RÉSUMÉ

L'hématémèse sanguine et le mélena sont les complications citées de l'operation pour l'ulcère gastrique et des statistiques probantes sont inclues Le credo chirurgical de l'auteur est le suivant "Les hémorrhagies fatales prennent leur origine dans l'artere gastrique gauche ou dans l'artère gastroduodénale Si l hémorrhagie est due à un ulcère gastrique, l'artère gastrique gauche doit être ligaturée à sa naissance Si l'hémorrhagie est due à un ulcère duodénal on doit ligaturer l artere gastroduodénale si on peut la trouver"

RESUMEN

El autor estudia la hematemesis y melena como complicaciones de la intervencion para tratar la ulcera gástrica, agregando ciertas estadisticas sobre este problema El autor expone su "credo quirurgico" personal "Las hemorragias fatales se producen en la arteria gástrica izquierda o en la arteria gastroduodenal Si la hemorragía se debiera a una ulcera gastrica, debe ligarse cerca de su origen la arteria gastrica izquierda Si la hemorragia se debe a una úlcera duodenal, debe ligarse la arteria gastroduodenal, si puede encontrarse"

RIASSUNTO

Discute ematemesi e melena quali complicazioni delle operazioni per ulcera gastrica riporta statistiche al riguardo Emorragie fatali derivano dall 'arteria gastrica sinistra e dall'arteria gastro duodenale Se l'emorragia e' dovuta ad un 'ulcera gastrica l'arteria gastrica sinistra va legata in vicinanza della sua origine Se deriva invece da un 'ulcera duodenale, s'impone—se possibile—la legatura dell 'arteria gastroduodenale

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I should like to [illegible] Dr [illegible] Dr [illegible]ton and Mr Bennett fc[illegible]ion service, Dr Miller [illegible] Strong who referre[illegible] [illegible]r Frank McKelvey R I [illegible] from a sketch made by the surgeon

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It is with profound regret that we note, as we go to press, the demise of Dr Victor Roman y Reyes, President of Nicaragua and Honorary Fellow of the International College of Surgeons The Board of Trustees, officers and members of the College unite in expressing sincere condolences, not only to the bereaved family but to the Republic deprived of his fine leadership

Surgical Management of Hydatid Cyst of the Lung

DR. JOSÉ SOLER-ROIG, F.I.C.S.*
Secretary, Spanish Chapter, International College of Surgeons
BARCELONA

THE incidence of hydatid cyst of the lung in Spain is not so large as in Greece, Argentina, Uruguay, Australia or New Zealand, but it is sufficient to provide some experience. Here the disease occurs more often in the liver than in the lung; yet in my clinic the frequency of pulmonary cyst is higher than that of hepatic cyst. This may be due to the fact that hepatic cysts are operated on in many clinics and that patients with pulmonary cysts come more often to specialized centers.

My purpose in this article is to present an operative technic that I have standardized: an operation in one stage, with free pleura or without, which in a series of more than 100 cases has resulted in no mortality and few complications.

The hydatid cyst represents a cycle in the life of *Taenia echinococcus.* This organism adopts different anatomopathologic characteristics according to its localization in the human body. One of the characteristics of hydatid cyst of the liver or of the lung is the formation of an adventitial membrane organized by either hepatic or pulmonary tissue with the growth of the parasite. This membrane, however, should not be considered a mere reaction of the tissue to the presence of a foreign body, for it also maintains a symbiotic process between the human being and the parasite. Through this adventitial membrane the parasite supplies its nutritional needs by imbibition. This applies to the parenchymatous organs (liver and lungs). In other sites—e.g., in the bones—the adventitial membrane does not exist, and the daughter vesicles invade the medullary cavity without any opposition from organic defense. Under these circumstances, hydatid cyst in the bone is highly malignant. In the lung, the cyst in its progressive growth rejects the pulmonary parenchyma, obeying the characteristics of this parenchyma (difference of density, bronchial induration) and being subject, in its growth, to the constant movement of the pulmonary parenchyma in the breathing process

As long as this cyst is growing and is surrounded by the adventitial membrane, it is a cyst of the first degree, the complete living cyst. Very often, in its growth, it comes into contact with the bronchial tree or near it, and often, in a moment of effort or coughing perforates into the bronchi, breaking the adventitial membrane and even the hydatid membrane, and producing what is called hydatidopthisis: invasion of the hydatic liquid into the bronchial tree with coughing of a large quantity of liquid, preceded by some blood. Sometimes this hematic coughing makes the patient anxious, and he consults a surgeon because he thinks he has tuberculosis Until this moment many patients show no clinical signs of disease.

When the cyst is near a large bronchus, the rigidity of the bronchial wall prevents formation of the adventitial membrane, and the bronchus is closed only by contact with the cystic membrane, which is very fragile. This facilitates perforation of the hydatid membrane and release of its liquid contents into the bronchial tree

Under these circumstances, two things may happen: (1) the hydatid membrane and its fluid contents may be ejected through the bronchial tree and the patient completely healed as a result, or (2) the hydatid fluid alone may be ejected through the bronchial tree, the membrane being retained in the cavity. This is a more frequent occurrence, as the membrane is often too large to go through the bronchial tree. Under these circumstances a second type of cyst remains: the dead cyst, with retention of the membrane.

In some cases the efflux to the bronchial tree is very small, and when the patient coughs some air penetrates between the adventitial membrane and the hydatid membrane, altering the nutritional status of the parasite and causing its death This condition is observed frequently in roentgenograms of hydatid cyst of the lung

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*[illegible] Spanish Chapter, International College of Surgeons [illegible]

More often it happens that the hydatid membrane is retained after evacuation of all of the liquid cystic contents The intracystic pressure relaxes and the atelectasia surrounding the adventitia disappears The elastic pulmonary tissue enfolds the solid rests of the hydatid membrane This represents dry retention of the membrane or dry cyst creating a new condition called the hydatid pyocyst (retention of the hydatid membrane with superadded infection) When such an infection is not well treated it may be the cause of chronic purulent expectoration with sputum similar to that associated with bronchiectasia

Fundamentally the diagnosis of hydatid disease of the lung is roentgenologic but one must observe the clinical and biologic signs as well Even so in many cases the diagnosis is difficult

The clinical signs are coughing dyspnea and fatigue The initial symptom is the appearance of blood in the sputum The patient and his physician both suspect some form of pulmonary tuberculosis Often the patient goes to an antituberculosis center and there with the help of the roentgenologist, the true diagnosis is made

I have observed many forms of silent evolution in which the cyst grew slowly to a large size without any clinical manifestations whatever The roentgen picture of hydatid cyst is classic but not always easy to diagnose Beclere described the cysts as round forms with sharply limited contours looking as if drawn with compasses This has been discredited, Escudero and Sergeant have said lately that no form so neatly rounded is a hydatid cyst of the lung The roentgen diagnosis is confirmed by deformity of the cyst during respiratory movements On deep inspiration it maintains its spherical form on expiration it is always flattened and ovoid This is due to its elasticity and its liquid consistency

Some authors have observed buoyancy and oscillation of the cyst during respiration, the oscillations suggesting the movements of a buoy in the open sea

When clinical phenomena have occurred in the neighborhood of the cyst, one can see in

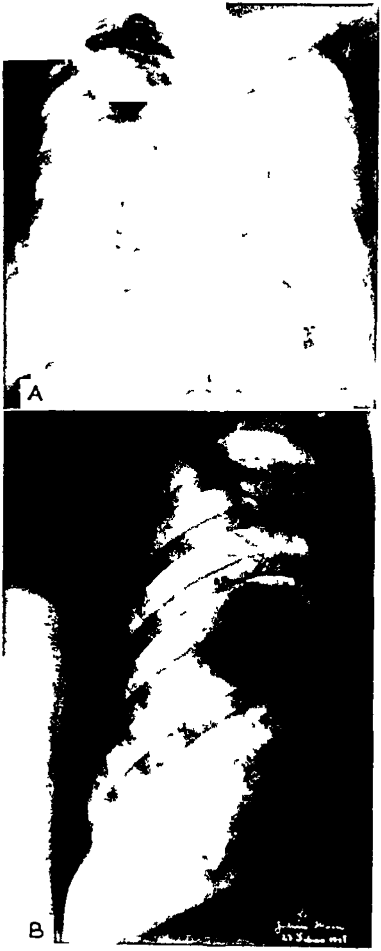

Fig 1 — A anteroposterior view showing round mass on upper part of right lung Peculiar irregularities were noted in lower anterior border of cyst *B*, same patient after pneumothorax Borders of mass still irregular, this was probably not a hydatid cyst but a pulmonary carcinoma

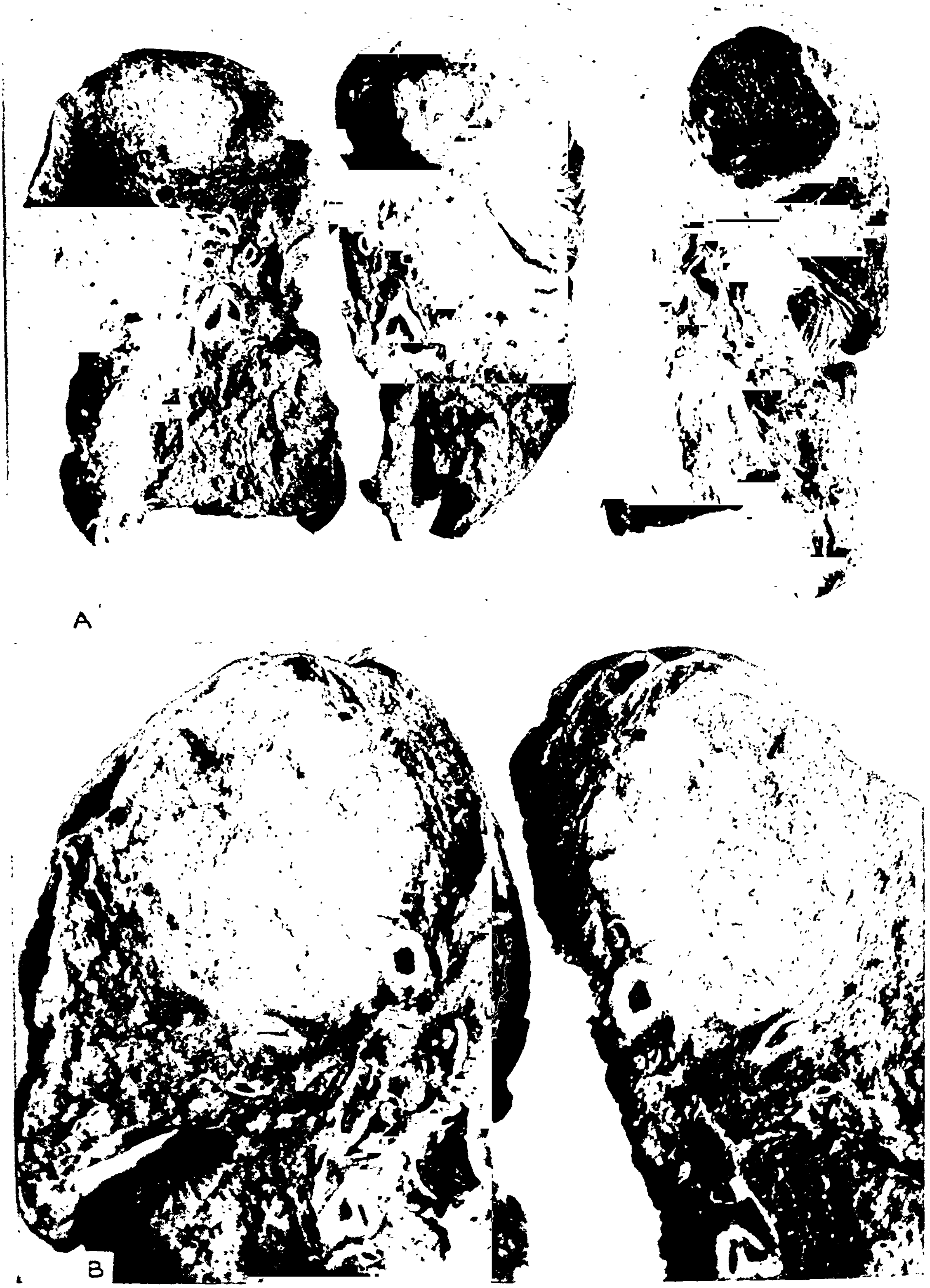
A
B

Fig 2 (same case) —*A*, specimen after pneumonectomy, showing neoplastic mass at different depths in pulmonary tissue *B*, view of the bronchial tree seen through the tumor

the roentgen picture the sign of Morquio, the pericystic pneumothorax This is a small air insufflation, called by Deve "calotte aérienne"

The biologic signs are revealed by the Casoni test (intradermal injection of one drop of hydatid liquid) which commonly gives a positive reaction in the sensitized carrier of hydatid disease This test is very important when its results are positive, but in some cases when the cyst is closed and surrounded by much tissue reaction, the results may be negative Also, the test has given positive results in some cases in which no hydatid disease existed, and this proves that one must be careful not to overestimate its significance

If eosinophilia is present to a large extent, it also is helpful in confirming the diagnosis, but, as is well known, eosinophilia sometimes coexists with other conditions as well

The Weinberg reaction is routinely used, but its results are not entirely conclusive Puncture of the hydatid cyst would be one of the best possible diagnostic methods but this puncture should never be performed because it is dangerous, it can even produce sudden death from allergic colloidoclassic shock The diagnosis can also be sustained by careful roentgen examination under the control of the biologic and clinical signs

In some casse the cyst must be differentiated from cancer of the lung, especially the metastatic forms of cancer, which produce round shadows on the pulmonary film In some cases a diagnostic pneumothorax can be used, because this modifies the form of the tumor and permits a positive diagnosis

Pulmonary abscess sometimes resembles the dry hydatid cyst associated with infection, but the clinical signs are different

The surgeon dealing with hydatid disease of the lung must bear in mind that tuberculosis and abscess of the lung are destructive processes whereas the hydatid cyst is a diastatic process which in growing separates the pulmonary tissues

For discussion of the diagnostic problem I present a personal case The patient came to me with the diagnosis of hydatid disease of the right lung (Fig 1*A*) The Cassoni reaction was positive, the leukocyte count revealed 8 per cent eosinophils The only clinical sign was coughing Bronchoscopic examination re-

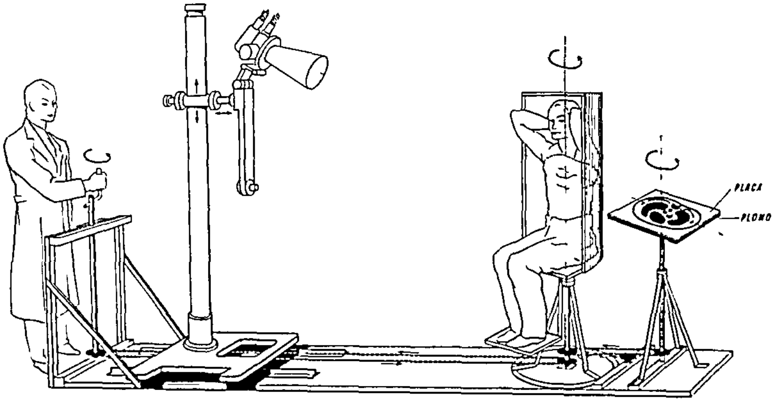

Fig 3—Roentgen apparatus described in text

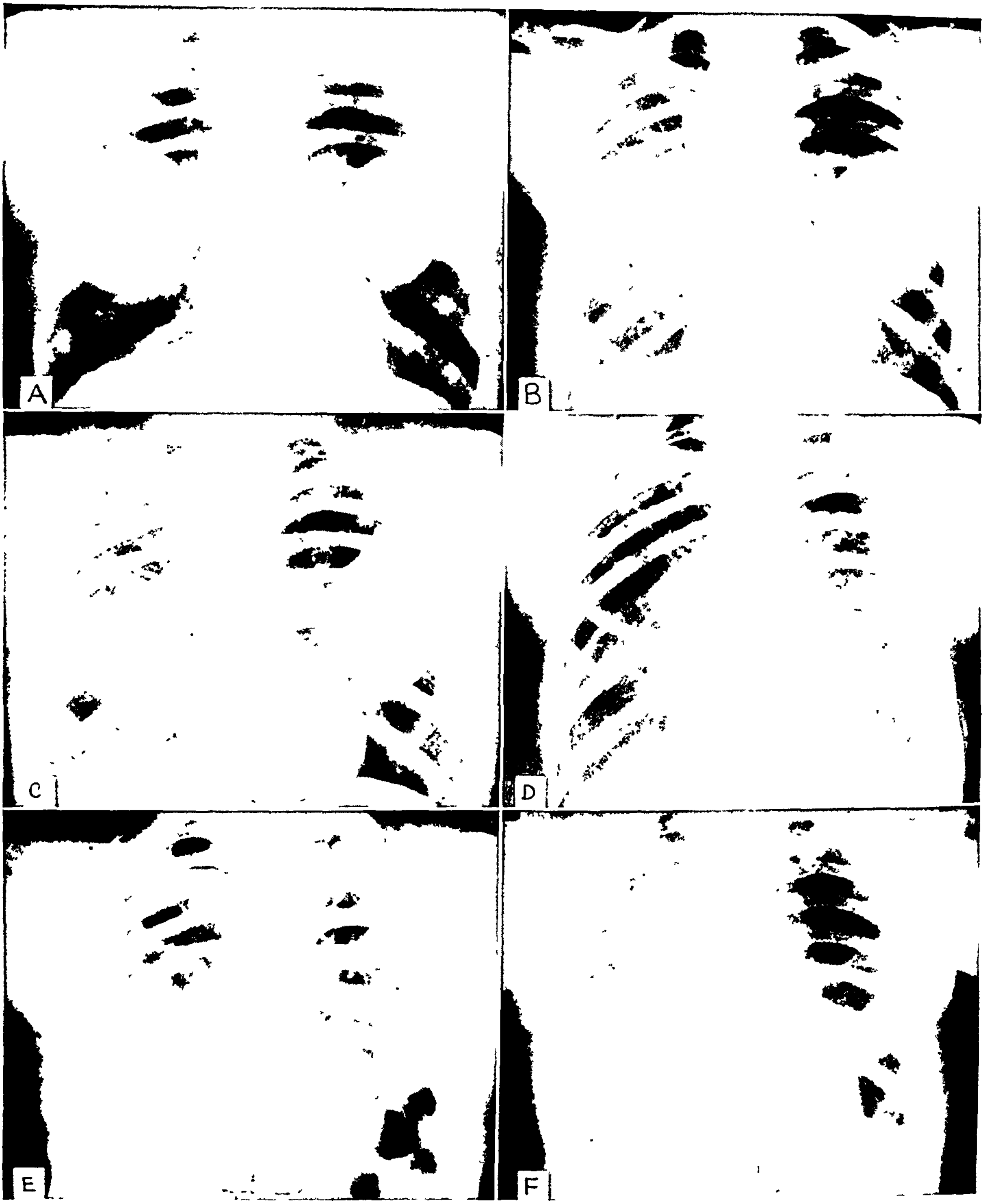

Fig. 4.—*A*, anteroposterior roentgenogram of patient with three distinct cysts, two in right lung and one in left. *B*, same patient after one-stage operation to extract both cysts from right lung. Small mass appears on right mediastinal border. *C*, healing of scars in right lung prior to operation on left. *D*, patient after healing of the three cysts. Note mediastinal growth showing presence of a fourth. *E*, patient after healing of all four cysts, with no indication of a fifth. *F*, fifth cyst appearing on upper lobe of right lung.

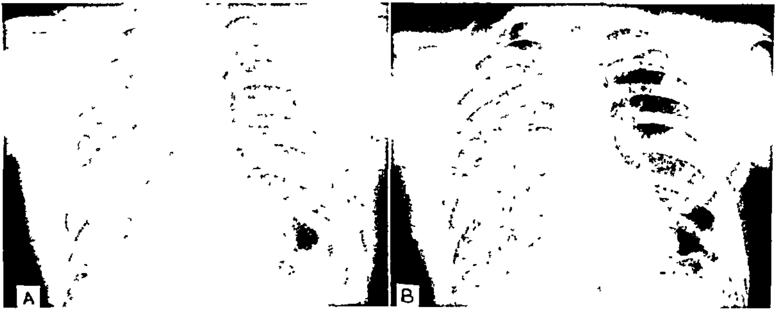

Fig. 5.—*A*, same patient after hydatidopthisis. Note retention of the membrane and fluid level. *B*, same patient after excision of fifth cyst. Film shows complete healing of pulmonary parenchyma.

vealed no abnormality The roentgenogram showed a round mass with some irregularities on its borderline An artificial pneumothorax confirmed the diagnosis of cancer (Fig. 1*B*). I performed a thoracotomy, which further confirmed the diagnosis, and I proceeded then to perform a total pneumonectomy (Fig. 2).

The creation of a pneumothorax is very useful in cases of neurinoma, because this type of tumor is sometimes round and may be mistaken for hydatid cyst, but it is always extrapulmonary and in contact only with the internal wall of the thorax By producing a pneumothorax it is easy to confirm its position

My collaborators, Dr Modolell and Dr. Manchón, of the roentgenologic department in my hospital, have recently invented a new and amazingly ingenious procedure for localization of thoracic conditions This procedure permits the making of cross-section tomograms of the body, giving the third dimension (Fig 3)

The patient sits on a revolving bench, connected to a table which revolves at the same speed, holding a flat roentgen plate. The revolutions of the patient enables us to obtain the cross-section film Figures 1 and 2 are examples of these amazing roentgenograms. Fig 2*B* shows the method of Modolell and Manchón

This method is extremely useful for localization of all pulmonary conditions but can be used for any part of the body.

TREATMENT

The surgical treatment of hydatid cyst is still a matter of some disagreement in the different surgical schools. In the beginning the operation was a very delicate one, the risk was

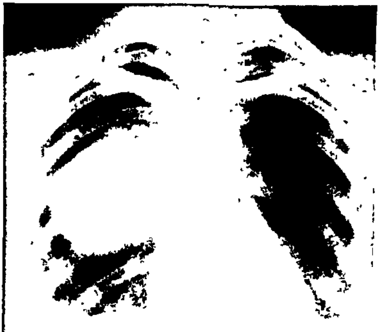

Fig. 6—Anteroposterior roentgenogram of another patient with voluminous hydatid cyst of right lung

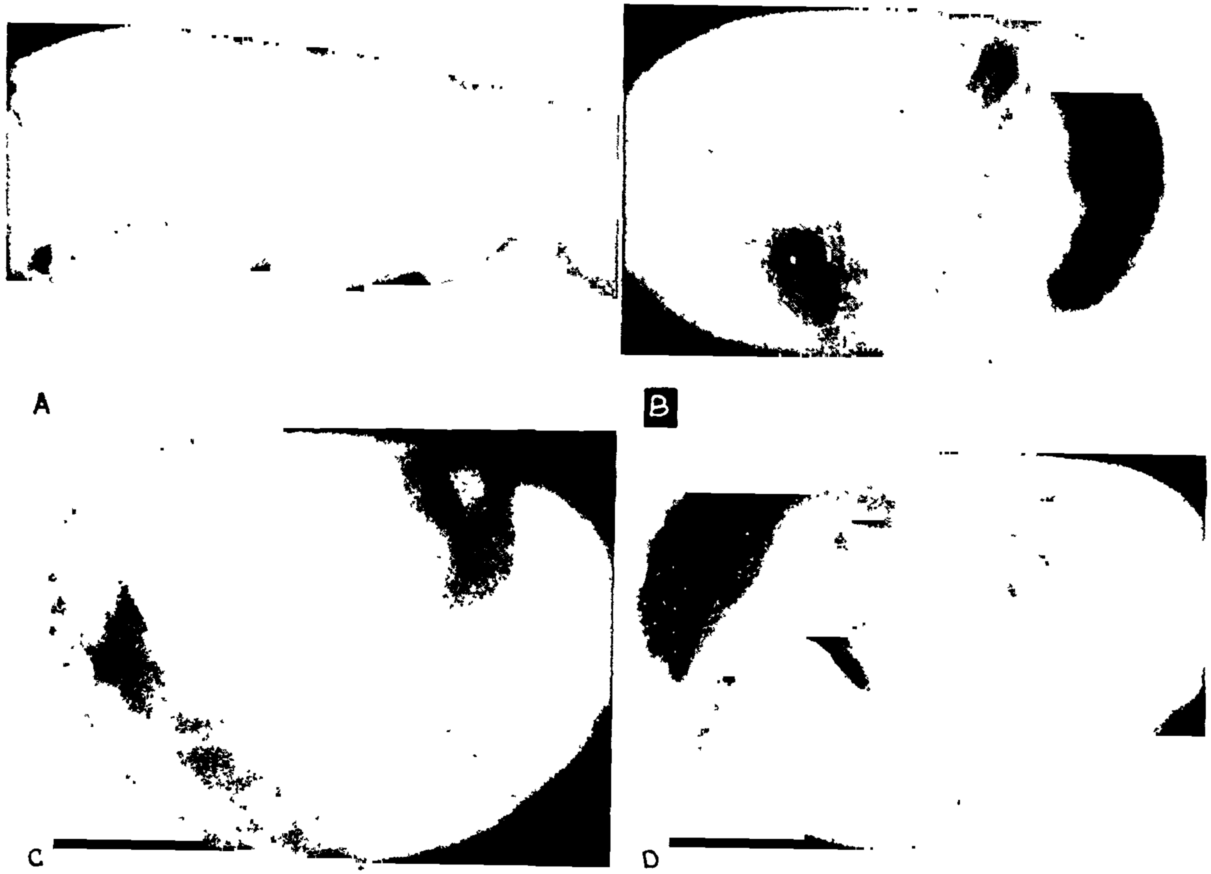

Fig. 7.—*A*, very high cross section at level of neck to show pulmonary apices, trachea, vertebral process, clavicles and first, second and third ribs. *B*, cross section at different level. *C* and *D*, cross sections showing posterior location of cyst near vertebra and heart.

great, the mortality high and the procedure always dramatic. These difficulties and dangers were the result of creating an operative pneumothorax in the presence of nonadhesive pleura. The routine treatment was marsupialization, and the constant complication was pleural infection. Bronchocutaneous fistula occurred frequently and persisted endlessly.

In order to avoid some of these inconveniences, Arce and Finochietto, of Argentina, suggested a preliminary pneumothorax. Lamas and Mondino were performing marsupialization when they observed pleural adhesions. In the presence of free pleura they suggested a two-stage operation, obtaining the pleural adhesions by leaving a swatch of iodoform gauze in contact with the pleura.

Posadas proposed employing a one-stage operation only in cases of living cyst without infection, suturing the lung without drainage. This method has been used by Makkas in Greece. Some surgeons, e.g., Allende and Langer, suture the bronchial tree after extracting the cyst. Recently, Taiana suggested cystectomy with section of the adventitial membrane and suture of the bronchi, but when the cyst is very large he suggests a pneumonectomy or a lobectomy.

I do not agree with this opinion, because I consider it necessary to be very conservative with lung tissue in cases of cyst. In order to prove my point, I present Figure 4. The patient here represented had three very large hydatid cysts (Fig. 4*A*). I operated in one stage, in a manner to be explained later, first on the right lung, extirpating two of the cysts (Fig. 4*B*) and then, when the scar of this operation was in good condition (Fig. 4*C*), on the left lung but I did not pay much attention to a little mass that appeared on the right mediastinal side of the right lung. When the cyst of the left lung was healed (Fig. 4D) another paramediastinal cyst was diagnosed and another one-stage operation performed (Fig. 4E). Some time later the patient returned with still another cyst at a higher level in the right lung (Fig. 4F). This cyst communicated with the bronchial tree producing hydatidophthisis but keeping the parasitic membrane inside it. A fluid level was visible in the film. I operated again in one stage obtaining complete healing of this patient (Fig. 5). This case proves the necessity of being conservative. I could not accept the idea of performing so many lobectomies or segmentectomies on the same patient and in any case lung tissue has an enormous capacity for recuperation. Figure 6 shows the patient in the anterior and posterior positions.

The cross section roentgenogram (Fig. 7A) shows a very high cut; one can easily see the vertebral process, the clavicles, the trachea and the apex of the lung.

Figures 7B and 7C show the same patient at different levels with posterior localization of a hydatid cyst of the lung.

TECHNIC

Intratracheal tube, pentothal flaxedil or curare anesthesia is employed. I do not consider it too important whether the pleura is free or presents adhesions. I isolate the tissues surrounding the cyst with serum wet gauze keeping the cyst external as far as possible. I confirm the diagnosis by puncture, then I make an incision in the lung tissue in order to permit extraction of the hydatid membrane. The cystic cavity is aspirated and then explored with an electric light. I do not suture the bronchi inside the cavity. These bronchi are useful for draining the cavity through the natural channels to the bronchial tree. I perform a suture of the lung itself and control leakage by pumping the lung full of air. The

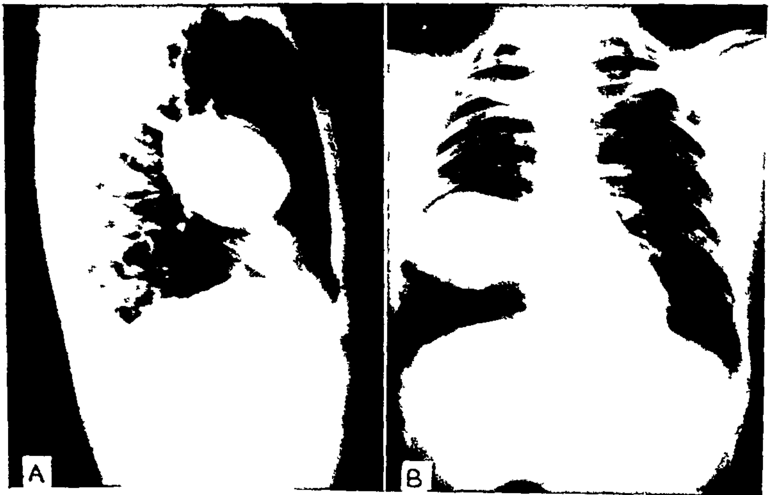

Fig. 8.—A and B, lateral and anteroposterior views of [illegible] with [illegible]

suture is attached to the walls of the thorax, and no drainage is employed. This technic is used not only for the living cyst but for the dry cyst containing only the membrane. Infection is produced only by retention of this membrane, and I clean the cavity with penicillin and consider the bronchial communications sufficient as drainage if any bronchi exist in the cavity, as is nearly always true. The only condition for which I employ drainage is pyocyst without bronchial communication.

The statistical records at the time of writing are fairly extensive and show constantly good results.

SUMMARY

The nature and treatment of hydatid cyst of the lung are discussed, with considerable stress on the need of caution and conservatism in the surgical handling of pulmonary tissue. The author's own technic is presented and explained. The results of its use in a considerable series of cases have been good.

RÉSUMÉ

La nature et la thérapeutique du kyste hydatide pulmonaire est étudié pesant fortement sur la nécessité d'agir avec prudence et conservatisme pendant la manipulation chirurgicale du tissu pulmonaire. La technique de l'auteur est présentée et expliquée. Les résultats de son emploi au cours d'une série importante de cas ont été satisfaisants.

RESUMEN

Se estudia la naturaleza y tratamiento del quiste hidatídico pulmonar destacando especialmente la necesidad de proceder con cautela y con un criterio conservador al intervenir quirúrgicamente los tejidos pulmonares. El autor presenta y explica su propia técnica. Los resultados obtenidos mediante la misma en un considerable número de casos han sido buenos.

RIASSUNTO

Discute la natura e la cura delle cisti idatidee del polmone, sottolineando la necessita' di molta prudenza e di spirito di conservazione nel maneggiare il tessuto polmonare. L'A. illustra la propria tecnica operativa, che ha condotto a buoni risultati in un numero notevole di casi.

Of Truth

Time, whose tooth gnaws away everything else, is powerless against truth.
—*Huxley*

Defeat is a school in which truth always grows strong.—*Beecher*

God offers to every mind the choice between truth and repose.—*Emerson*

Truth is such a precious article, let us economize it.—*Mark Twain*

Brown-Sequard Epilepsy Induced by Cutaneous Parasites

DR ANDRE PLICHET*
Editor *La Presse Medicale*
PARIS

IT IS well known that Brown Sequard, by partial resection of the sciatic nerve in guinea pigs induced a certain form of epilepsy. After some weeks the animals showed important modifications of sensibility in the area of the head and neck on the side on which the sciatic nerve had been sectioned. Pinching in this zone produced no painful reaction but provoked clonus of the hindleg, a scratching reflex ending rapidly in a typical fit of epilepsy with loss of consciousness and tonic and clonic convulsions.

The proportion of success in this experiment when performed by others is variable. Pagniez, Koenig and I have shown that epilepsy is more easily obtained by disarticulation of the corresponding hindleg than by resection of the sciatic nerve.

This form of epilepsy has two characteristics that make it interesting for study, on the one hand, these fits are somewhat similar to those of human epilepsy and on the other hand the epileptic guinea pig is afflicted like man himself with a real and lasting disease. Like the human epileptic patient the animal becomes a "convulsionnaire" in display with the peculiar characteristic that a paroxysm can be provoked at will.

The cause of this epilepsy has not been clear. Brown Sequard considered it a form of ascending degeneration consequent upon resection of the sciatic nerve, but the fact that my associates and I obtained it in a very short time by aseptic amputation of the hindleg (which excluded also the possibility of a traumatic neuroma of the sciatic nerve) prevents us from accepting this idea.

Dr Pagniez, Dr Laplane and I (*Presse Medicale* Oct 6 1934) have demonstrated that this epilepsy is intimately connected with the multiplication of lice in a zone where the animal cannot scratch itself because of resection of the sciatic nerve or amputation of the hind leg.

This multiplication of the lice did not escape the attention of Brown Sequard but he noted it merely as a curious accessory incident. It is obvious that in the epileptic guinea pig the fur in the epileptogenic zone is infested with many more lice than is the fur elsewhere on the body. The explanation of this fact is simple: first the epileptic guinea pig has lost the sensation of pain in the epileptogenic zone, and second it is not able to scratch the area with its hindleg; therefore the lice are undisturbed and multiply rapidly.

To establish proof of the part played by the lice, we destroyed all parasites in the epileptogenic zone with xylol (and later with DDT) or by shaving the fur. When this had been done, pinching the epileptogenic zone induced the convulsive fits only rarely and with great difficulty and the next day no fit could be induced at all. The animal recovered the sensation of pain and squeaked when pinched in this zone exactly as when pinched elsewhere. All was again normal. After some weeks, however the lice reappeared in the area that had been shaved or disinfected. This area once more lost all sensibility to pinching and a fit could be induced just as before.

On a second guinea pig we were able to perform a still more conclusive experiment by *reducing* the epileptogenic zone. In the middle of the zone we shaved an area 1 cm wide. On the following day we noted that pinching in this shaven area made the animal squeak, but that the same pinching in areas immediately adjoining it still covered with fur and lice, provoked clonus of the stump and a generalized epileptic fit.

It is therefore certain that Brown Sequard epilepsy in the guinea pig is intimately related to the presence of a great number of lice in the epileptogenic zone. Under these conditions it is unnece [illegible] r [illegible] he sciatic

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*Assistant in Medicine Hospital Saint Antoine Paris

Fig. 1.—Clonic phase. The animal has fallen on its back, with its head turned to one side, its mouth open and its paws convulsed.

nerve or to amputate the hindleg. Merely by preventing the guinea pig from scratching itself in a certain place it is possible to create an epileptogenic zone due to the increased local infestation by lice. One can fasten the hindleg of the guinea pig or wrap it in a bit of cloth or rubber, and after a certain time one can produce an epileptogenic zone and fits of epilepsy.

What is the action of the lice? Those that developed on our guinea pigs were of a special species, from the family of the mallophages: *Gyropus ovalis, gyropus gracilis* and *Menopon extraneum*. These lice are not pricking insects, and no red globuli could be found in their digestive organs. One might imagine that they put into the skin an irritative substance acting directly or by a process of sensitization, but this hypothesis also seems false. We crushed a great number of mallophages and put the mixture under the skin of a new guinea pig hypodermically or by scarification; no epileptogenic zone developed. We devised a small instrument for superficial and repeated pricking, provoking a constant and prolonged irritation of the skin at the same place, but this also failed to create an epileptogenic zone.

Fig. 2.—Interparoxysmal phase. The animal is still unconscious; its head is strongly bent and its forelegs stretched. It is about to fall again, with total loss of consciousness.

It is possible that the lice act merely by their presence and by frequency of contact with the nervous extremities, the nerve losing its normal sensibility and acquiring a new character. Perhaps they take away, by sucking, a certain quantity of the secretions of the cutaneous glands or of certain normal elements of the skin, which loses its natural quality as a result.

These are questions to which we still have no answer. What we can say is that a very large number of lice is necessary to create an epileptogenic zone. The severity of the fits seems to be in proportion to the number of parasites, and this fact explains the different results obtained by various experimenters. Some have had 90 per cent success and others only 15 per cent.

My friend Dr. W. Liberson (of Hartford), who observed my experiments when he was in France, had great difficulty in developing epileptic guinea pigs in Canada, where he worked for a certain time. This suggests that the animals in the laboratories of the New World are cleaner than those in old Europe; they have fewer lice. Or was it perhaps due to the season? During a very cold winter we were surprised to see that guinea pigs which had been operated on did not become epileptic, but in the spring, some weeks later, all of them had fits. At the beginning of our experiments, when we did not know the part played by the lice, we had thought it an anomaly due to the diet.

We know now, however, that if the guinea pigs had no fits in the winter it was because the mallophages had not become numerous enough during the cold weather

COMMENT

The experiments described in this article which we performed for therapeutic ends brought us to the conclusion that Brown Sequard epilepsy in the guinea pig is closely related to the multiplication of certain species of lice in a certain zone The nervous lesion formerly considered essential is in reality an accessory condition Resection of the sciatic nerve is effective only because it prevents the animal from scratching a zone that it cannot touch with its teeth or its other paws

It has been said that Brown Sequard epilepsy is epilepsy due to a reflex but having a substratum of neuropathologic change It appears now, on the contrary, that it is an epilepsy without a nervous lesion at least without a lasting one It disappears with the parasites that cause it But it is an epilepsy with a cutaneous starting point, which demonstrates the importance of peripheral irritation as an epileptogenic agent This is the first experimental demonstration of the possibility of convulsive manifestations due to a parasitic agent

Are there other animals in which epileptic fits can be obtained by the same method? We tried many times on the rabbit with amputation of the hindleg but we could never create an epileptogenic zone We were more successful with white rats and white mice but the fits were not half so striking as those of the guinea pigs Perhaps the rats and mice were not infested by the proper parasites Dogs may have spontaneous fits of epilepsy, which in France are due to an acarid living in the ears of the dogs If one kills all the acarids by a special treatment, the fits disappear also

We have never observed fits of this kind either in children or in adult man, but the experimental facts just recorded suggest that perhaps epilepsy due to parasites is more frequent than has been suspected

RÉSUMÉ

L'auteur mentionne des cas d'épilepsie du type Brown Séquard se produisant chez le cobaye fortement infesté par certaines espèces de poux Il relève que l'épilepsie due à l'irritation cutanée par certains parasites peut aussi *se produire chez l'homme*

RESUMEN

El autor comunica una epilepsia del tipo de Brown Sequard que *se presenta en los animales de experimentación (cobayos) intensamente infectados con piojos de ciertas especies Se indica que la epilepsia por irritación cutánea causada por los parásitos puede también* presentarse en el hombre

RIASSUNTO

Descrive una forma di epilessia tipo Brown Sequard che ricorre in animali da esperimento (cavie) infestati da alcune specie di pidocchi Non è da escludersi che anche nell'uomo l'epilessia possa insorgere da irritazione cutanea di origine parassitaria

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Austrian Assembly, 1950

The Annual Assembly of the [illegible] Chapter International College of Surgeons will be held in Vienna on June [illegible] and July [illegible] 1950 For [illegible] write to Prof Dr Felix Mandl, [illegible] 6, Vienna [illegible]

Total Sterilization of Operating Room by Antibiotic Aerosol

PROF. DR. A. M. DOGLIOTTI, F.I.C.S.
Past President, Italian Chapter, International College of Surgeons
TURIN, ITALY

AN OPERATING room completely sterilized by antibiotics was first employed in the Surgical Clinic of Turin in October, 1949. My associates and I believe it to be an absolute and promising novelty and one that may mark the starting point of substantial progress in the organization of the operating rooms of hospitals and clinics in the future.

So far as we know it is the first of its kind, and we are sure that, like all innovations in the surgical field that offer greater safety to suffering humanity, it will become an object of interest and study. Surgeons today feel an obligation not to neglect any method that may reduce the danger of surgery and the hazards of its most dreaded complications.

Before explaining the criteria adopted in construction of this operating room, I wish to recapitulate briefly some considerations leading to the experiment.

Our aim was to obtain sterilization of the room itself by means of penicillin aerosol. We all know the importance of asepsis in the operating room, but in spite of great progress in the construction and organization of operating rooms in modern hospitals, a certain number of infections still occur, depending on the surroundings in which the operation is performed. This happens especially when several patients are operated on one after another in the same room, but it happens also in the course of a long-lasting single operation.

What surgeon, indeed, does not even now encounter some infections of greater or less degree, or some secondary complication of the infectious type—phlebitis, pyelocystitis, pleuropulmonary foci, etc.—of which it is logically believed that introduction of the pathogen occurred during the surgical procedure?

Only by multiplying precautions to render our methods of sterilization thorough and complete and by keeping away from the operating field all potential factors of infection can we reduce the danger of infection to a minimum. By no method thus far devised has it been possible to exclude all risk.

Attempts to obtain total disinfection of the surroundings were made many a time in the past. We all remember Lister's historic attempt, in which he sprayed the surroundings with carbolic acid. Many others, after Lister, tried disinfection by pulverization and evaporation of antiseptics; but these methods found no practical application because of the harmful effects of the substances used, either on the patients or on the surgical staff.

In the most up-to-date and perfectly maintained operating room, the possibility of contamination by air-borne pathogens remains, even though the air is conditioned and filtered and the operative surroundings are sterilized by prolonged preoperative ultraviolet irradiation. This fact is demonstrated by a simple experiment, which consists of exposing, for the whole duration of the operative procedure, some agar-agar plates. On these plates a varying quantity of various organisms can be detected (the variation depending on the given environmental conditions), some of which are pathogenic to man. By means of this simple experiment we have been able to demonstrate repeatedly the impossibility of complete asepsis by common methods of sterilization of the operating rooms.

Now, however, we believe it is possible to avoid this persistent danger by applying the method we are introducing. We have confirmed its efficiency by actual trial.

Our plan was realized by building, inside one of the large operating rooms in the Surgical Clinic of Turin, a smaller room (but sufficiently large for all the necessities of major surgical procedures) entirely constructed of glass and duraluminum; practically airtight,

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From the General Surgical Clinic, University of Turin, Prof. Dr. A. M. Dogliotti, Director.

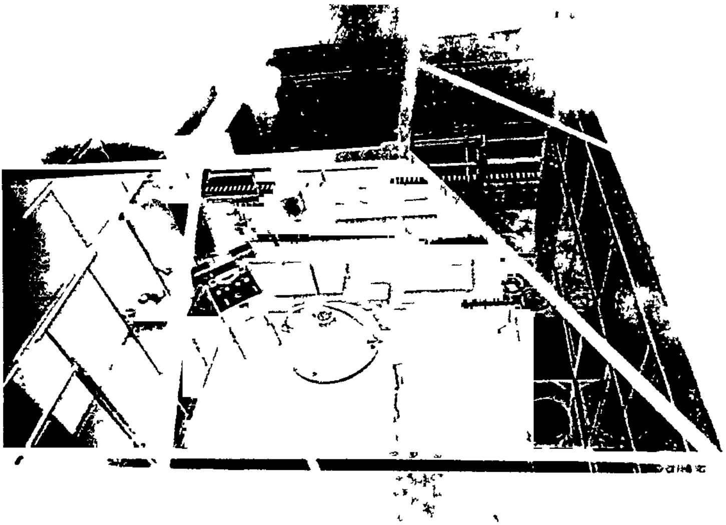

Fig 1—Operating room seen from student gallery

in which the operating table the surgical staff the anesthetists the auxiliary anesthetists the service staff the instrument table the anesthesia apparatus and Guassardo s pilot control for automatic regulation of the aerosol fog are comfortably accommodated The operating room is sterilized during the night by means of special bactericidal ultraviolet lamps Shortly before the operation commences penicillin aerosol is introduced by means of a series of 8 "nozzles placed in the corners of the operating room itself These ' nozzles are supplied with a tube carrying filtered compressed air appropriately conditioned for temperature and humidity The air compressor the filters and the air-conditioning apparatus are all arranged on the upper floor The density of the aerosol fog in the operating room is automatically controlled by the photoelectric cell contained in Guassardo's pilot apparatus The filtered and conditioned air inlet can work independently of aerosol in order to assure an adequate supply of oxygen to the room

When the surgeon operates under these conditions he can rely on simultaneous and continuous action of the penicillin contained in the atmosphere in the form of tiny drops which fall on the wound the exposed viscera and the body tissues For operations in the thorax (which may last several hours) in the cranium and in the abdomen (in which viscera are amply exposed) the air containing the antibiotic substance will penetrate everywhere keeping the remotest nooks in the operative field under its action On the other hand there is a continuous penetration of penicillin through the patient's windpipe and broncho-pulmonary system and also in the blood stream with a presumably preventive action against postoperative pulmonary complications

We are now trying to determine the quantity of penicillin that goes into the blood through the alveolar surface and therefore in addition to being active on the spot, is also active in the blood stream.

The antibiotic fog acts upon the entire operating room, as well as upon the operative field and the patient. It deposits a microscopic antibiotic sediment on all exposed matter; on the surgeon's hands, on the table, on the instruments, on the catgut and silk, the gauze, the sterilized towels; in short, on everything that comes sooner or later into contact with the wound. Organisms projected into the atmosphere by the surgeon, by the patient or by the operative personnel in speaking or moving about are suppressed by the thick fog made up of innumerable microscopic drops of antibiotic aerosol.

These are the favorable factors on which we rely in presenting our new antibiotic operating room. Several colleagues have already formulated objections, which I must answer immediately. Can the persons working in the operating room—surgeons, anesthetists, nurses and others—be harmed by living and breathing for hours in an atmosphere of penicillin aerosol fog? Above all, is there danger of getting accustomed to the antibiotic or developing a resistance to it, such as would make its use ineffective in case of need?

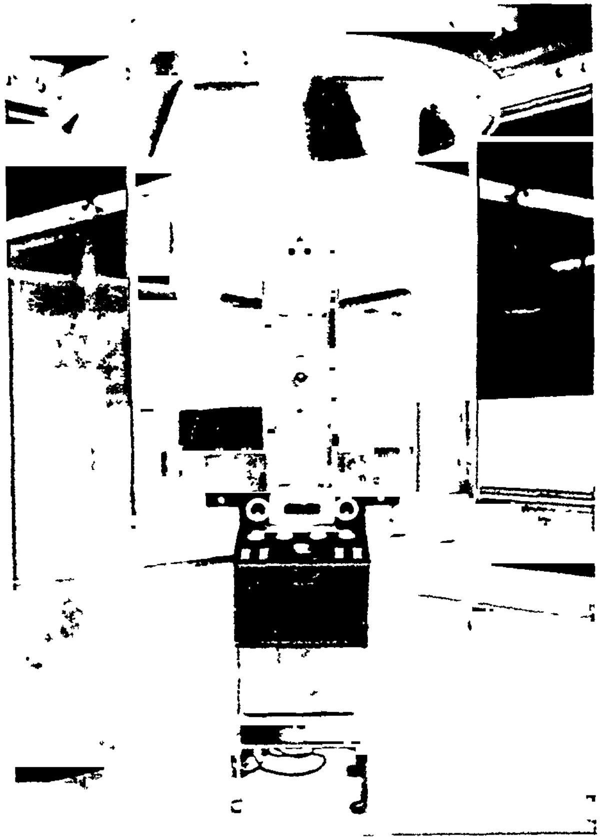

Fig. 2.—Corner of antibiotic operating room with apparatus for automatic photoelectric regulation of aerosol fog

Fig. 3.—Another corner, showing column with 2 nozzles (above), various lights, including ultraviolet, and aerosol control buttons (central part). Shorter column on floor is for oxygen, anesthetic gases, diathermy, endoscopic studies, etc.

We believe that there is not the least cause for worry in this respect, because the eventual maximum tolerance acquired does not represent a disadvantage. Resistance to penicillin by pathogenic organisms, it is true, would be important. But these organisms change constantly, and we do not believe that any such resistance can occur in our operating room, in which bactericidal ultraviolet rays are at work when the surgeon is not operating and will destroy all penicillin-resistant germs. We therefore believe that from a biologic point of view there is no danger to the operating staff

Further communications will be made after longer trials and additional experimental work

A second objection deals with working costs Our first experience permits us to affirm that with 2,000,000 oxygen units we can keep our operating room supplied with sufficient penicillin to guarantee absolute asepsis and antisepsis for three to four hours, a sufficient length of time to perform even the longest operations We believe that the expense is fully justified if it produces, for the first time in the history of surgery, an operating room in which total sterilization of the air and all contents is achieved, for it gives the patient the certainty of escaping infection and the surgeon a final victory over one of the greatest obstacles to the triumphant advance of his art

SUMMARY

A new method of total sterilization of an operating room by means of antibiotic (penicillin) aerosol is introduced The method is already in operation at the Surgical Clinic of Turin and gives every evidence of success Its use was begun in October 1949 The author proposes to study the method further, with careful checking of the proved results, after which further publications will evaluate the experiment

RÉSUMÉ

Une nouvelle methode de stérilisation totale de la salle d'opération par l'antibiotique aérosol (pénicilline) est décrite Cette méthode est déjà en usage dans la Clinique Chirurgicale de Turin et paraît être couronnée de succès Elle a été utilisée dès Octobre 1949 L'auteur étudie les resultats de cette méthode d'une façon plus poussée en notant soigneusement les resultats patents apres quoi de nouveaux articles nous feront connaître la valeur de cette methode

RESUMEN

Se ha desarrollado un nuevo método para la esterilizacion total del quirófano mediante el aerosol de un antibiótico (penicilina) El método se está practicando en la clinica quirurgica de Turin con manifiestas pruebas de éxito habiéndose comenzado su empleo en Octubre de 1949 El autor se propone continuar estudiando este método, comprobando cuidadosamente los resultados obtenidos tras o cual otras publicaciones evaluaran el experimento

RIASSUNTO

Propone un nuovo metodo di sterilizzazione della sala operatoria mediante aerosol penicillina Il metodo e' gia' in funzione nella Clinica Chirurgica di Torino e sembra destinato ad un completo successo L'A si augura che il metodo venga studiato ulteriormente con un controllo accurato dei risultati Successive pubblicazioni potranno definitivamente stabilire l efficacia di questo metodo ancora nella fase sperimentale

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Homo Sapiens

Man is the only animal that laughs and weeps, for he is the only animal that is struck with the difference between what things are and what they ought to be

—*Hazlitt*

Man is the only animal that converses, therefore we know that he is Nature's masterpiece He says so himself —*Gavarni*

Man is the only animal that blushes Or needs to —*Mark Twain*

Duodenal Obstruction

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THE TERM "duodenal obstruction" covers as many different conditions as does the term "intestinal obstruction." Clinically, however, the condition presents characteristic features, and, as the literature contains only a limited number of reported cases, a small series from the Karolinska Sjukhuset in Stockholm may be of interest.

Etiology and Pathogenesis.—The cause of duodenal obstruction may be found inside the lumen, in the wall, or entirely outside the organ. Congenital as well as acquired disease may be responsible. According to its relation to the ampulla of Vater, the stenosis may further be divided into (a) suprapapillary and (b) infrapapillary stenosis.

Congenital intraluminal stenosis is most frequently due to atresia, which may be attributed to the embryonal occlusion described by Tandler. This atresia may be of any degree, from a simple mucous diaphragm, complete or incomplete (Brattstrom) through a stage in which two culs de sac are connected with a band (Mohrman) to complete disappearance of a segment, with two complete, independent culs de sac. These forms of intestinal atresia, which have been thoroughly studied by the Swedish surgeon Forssner, are most frequently located in the duodenum, as was pointed out first by James Calder in 1753 and later by Boernerus in 1754 and Boyd in 1845. Davies and Poynter's statistics include 392 cases of intestinal atresia, in 134 of which the condition was duodenal, in 59 suprapapillary and in 75 infrapapillary. For children the incidence is estimated at 1 in 20,000 (Benson and Grover). Intraluminal stenosis may further be caused by an intrauterine ulcer with obliteration of the lumen (Dahl Iversen).

Congenital stenosis may also depend upon lesions outside the duodenum proper, in most cases disturbances of intestinal rotation, consisting either in incomplete fixation of the cecum and the ascending colon (Bloodgood; Donovan; Donovan and McIntosh; Wilkie) or incomplete descent of the cecum, which is being fixed to the duodenum by a band (Dahl Iversen; Donovan; Vilette). A compression of the duodenojejunal junction may arise from abnormal intestinal mobility; e.g., a common ileocolic mesentery (Ehrenpreis; Janker) with a disposition toward volvulus, the proximal end of which is most frequently situated at Treitz' ligament (Dahl Iversen; Janker). The pathogenic significance of incomplete descent of the cecum or of fetal peritonitis is completely denied by Tandler; it must, however, be admitted that this pathogenesis is well established in several cases reported in the literature. An abnormal fixation of the duodenojejunal flexure as a result of abnormalities at Treitz' ligament may likewise give rise to stenosis (Nordentoft); Hellström has reported a case of this kind in which an abnormally fixed fold of the peritoneum has given the flexure a more pointed form than is normal. In Morlock and Gray's peculiar case the deficient intestinal rotation was complicated by a hernia extruding through an opening in the mesentery corresponding to the lower portion of the ileum. In addition to the etiologic factors already mentioned, compression may be due to fetal peritonitis with formation of adhesions (Stenson; Webb and Wangensteen), also to pressure produced by congenital tumor or cyst or by an open annular pancreas. In 1 of Webb and Wangensteen's patients the proximal and distal segments were divided by an annular pancreas, and in another case a stricture was present below the papilla of Vater; the head of the pancreas enveloped the duodenum at the point of obstruction.

An intermediate form of acquired obstruction is arteriomesenteric compression, the cause of which lies in the anatomic conditions at the origin of the superior mesenteric artery, where it rides across the inferior horizontal part of the duodenum. Numerous other factors, congenital as well as acquired, are significant in this connection. The congenital conditions associated with predisposition include

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From the Karolinska Sjukhuset, Surgical Department, Prof. John Hellström, M.D., Chief.

the asthenic habitus, a short mesentery a long ptotic transverse colon nephroptosis pronounced lordosis, or even the erect posture of man Acquired factors include lack of fat in the mesentery or poor tone of the abdominal wall as in multiparae By arteriomesenteric compression is understood a compression of the duodenum produced by pressure between the spinal column and the aorta on the one side and the root of the mesentery containing the superior mesenteric artery on the other It must be remembered that the duodenum normally is slightly compressed and narrowed under the root of the mesentery and hence a tendency to obstruction will result if the lumen is further diminished This mechanism of arteriomesenteric compression was first described by Rokitansky in 1842, a number of investigators among them Kostlivy and Melchior, have nevertheless denied its very existence and relegated it to history on the basis of the fact (*a*) that in certain instances the dilatation may continue beyond the duodenojejunal flexure and (*b*) that no mechanical causative factor can be established It must on the other hand be emphasized that so many well established cases of true arteriomesenteric compression have been reported that this position can hardly be maintained At postmortem examination in which the diagnosis may be very difficult to establish (von Haberer), it has been possible to demonstrate a clear furrow in the duodenum under the mesenteric root (Blanc Perducet), and in some instances operation has revealed a sharp demarcation between the dilated and the nondilated area of the intestine (Campbell, Lidstrom, Vilette) The significance of downward traction of the viscera is stressed by a number of authors (Aschoff, Horsley Hurst, Miller and Gage, Rosenthal, Wilkie), who even consider this traction a *sine qua non* for the development of the condition, on the other hand at least 1 case has been reported (by Lidstrom) in which the dorsal position of the patient seemed directly responsible for the symptoms Probably this is true also of cases in which the condition has arisen after pneumonia typhoid or some other disease involving prolonged bed rest of debilitated or emaciated patients (Beck) Leriche mentions aerophagy as a pathogenic factor, this causes a slow gastroduodenal distention which may give rise to sudden arteriomesenteric compression There is no doubt that other factors of no slight importance exist viz nervous reflexes from the stomach and the duodenum with lack of coordination between the sympathetic and parasympathetic systems Impulses from the peripheral branches of the splanchnic and vagus nerves may give rise to dilatation of the stomach and contraction of the sphincteric muscles of the cardia and pylorus (Hunter Royle) This lack of coordination is supposed to account not only for acute dilatation of the stomach but for other conditions such as Hirschsprung's disease cardiospasm and probably even megaduodenum Operation—in which chloroform or ether narcosis must further reduce the tonus of the stomach—may involve stimulation of sensitive visceral or somatic nerves and cause dilatation of the stomach which may further by pressure on the mesenteric vessels cause arteriomesenteric compression (Devine, Dragstedt, Dragstedt Montgomery Ellis and Matthews, Gillespie) In this way quite a number of cases though not all, may be explained

Acute dilatation of the stomach may even arise as a result of operations on the limbs, in 97 such cases Laffer observed it in 60 patients after laparotomy and in 11 after operations on the limbs

Among acquired intraluminal causes of duodenal obstruction mention should be made of gallstones which have perforated to the duodenum and subsequently become impacted either in the superior part or at the duodenojejunal flexure producing total or partial obstruction there Apart from the natural channel the choledochus calculi most frequently leave the bile ducts by perforation to the duodenum or (less frequently) to the colon or other organs The relative frequency of perforation to the duodenum was suggested as early as 1877, in Murchison's classic report which states "Fistulae into the duodenum are not very uncommon" The same will be learned from any statistical account dealing with these diseases (Courvoisier and Naunyn, Gregersen, Judd and Burden Paul Moller, Roth, Schroeder and Sloth, Wakefield, Vickers and Walters) One of the cases reported in the literature (Scofield) presented features of special interest, it was impossible to demonstrate the presen [illegible] la or scar left by a fistula, between the bile ducts and the duodenum; it must therefore be presumed that the gallstones obstructing the duodenal lumen had passed through the choledochus in this case. In other instances the pathogenic feature claimed to be inflammatory hyperplasia of the pylorus, as the calculi were not in themselves large enough to obstruct the lumen (Hale White). It should be mentioned also that tumors may cause obstructions of the duodenum as well as of other parts of the intestine (Herz; Hart; Hansen; Netousak).

Acquired extraluminal stenosis may arise as a result of periduodenal or pericholecystitic adhesions that make a kink in upon the duodenum or compress it. Many authors have described this mechanism (Alex; Bircher; Cotte; Fleiner; Hochhaus; Kehr, Müller; Ollendorf; Papin; Villard; Wegele) after encountering the adhesions in their own cases. Duval has described a syndrome, "la périduodénite essentielle sténosante," in which periduodenal adhesions, the cause of which cannot be demonstrated, give rise to more or less severe stenosis of the duodenum (Duval and Roux; Duval and Gatellier); here, as in the case of adhesions elsewhere in the peritoneum, one is probably faced with local peritonitis causing more or less pronounced adhesions. Whether the condition may be established as an independent entity, is perhaps doubtful, and in order to arrive at this diagnosis all other possible causes factor have, in any case, to be exclude with certainty.

The duodenum may also be compressed by glandular tumors. ("flexure lymphome") due to a simple inflammatory process as in appendicitis (Duval and Roux; Okinczyc; Wantoch). This is not a particularly exceptional occurrence (Lardennois). The compression may also be caused by tuberculosis (Basabe; Janker; Kostlivy; Penich; Rowlands; Vilette; Wantoch), or by a tumor that has metastasized, as in Eichmeyer's case, in which the primary tumor was an ovarian cancer, or in the Petrén's case, in which cancer of the colon was the primary lesion. Retroperitoneal tumors, hepatic tumors and hepatic cysts may likewise produce compression, with consequent obstruction of the lumen.

In some cases it has been impossible to ascribe the condition to any particular cause, for which reason purely functional, kinetic neuromuscular disturbances of duodenal mobility have been held responsible (Brattström; Gillespie; Kostlivy; Nordentoft; Petrén). These disturbances may range from the slightest to the most severe degree.

A statistical account of the distribution of the causative factors among Danish patients has been published by Dahl Iversen, who found that in 14 of 24 cases of congenital stenosis the condition was caused by malformation of the intestine itself, and in 10 by external lesions.

If infrapapillary stenosis persists for any length of time the duodenum will be dilated and possibly become hypertrophic above the stenotic focus, thus forming a megaduodenum.

SYMPTOMS

Only a few cases of gallstones acting directly as the cause of duodenal obstruction have been reported in the literature. Those which I have been able to trace are briefly recapitulated in Tables 1, 2 and 3.*

The symptoms of duodenal obstruction may be acute or chronic; in adults the condition is most frequently chronic, with an insidious onset or an undiscovered preliminary stage; the lesion may also start as a chronic obstruction which later changes its character and becomes acute (Kraas and Beck). The history often indicates the origin; i.e., a long history of disease of the gallbladder or gastric ulcer may afford guidance.

The enormous tolerance of the duodenum to distention is to a certain extent responsible for the diversified character of the symptoms; e.g., a calculus may distend this organ considerably without giving rise to pronounced symptoms (Brocq, Brodin and Aime); this must be presumed to have happened in 1 of the cases here reported (Case 1).* Actual symptoms of obstruction may also be completely absent despite an apparently considerable occlusion (Dufour; Scofield; Wakefield; Vickers and Walters).

If the lesion occurs in a newborn infant, the clinical picture will be dominated by vomiting, constipation and reduced output of urine (Dahl Iversen), to which must be added dehydration (Benson and Grover-Lee); vomiting sets in about five days after birth. The child will become emaciated and will die quickly of emaciation and dehydration if treatment is not instituted.

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*Tables and illustrated case reports included in Dr. Hertz' article will appear in June issue.

If the condition occurs in an adult another triad of symptoms—pain, vomiting and emaciation—will dominate the clinical picture. The presence of pain is however indicated with a striking difference. Some patients have practically no pain, others mention slight sensations and rumblings in the epigastrium, still others have suffered from intense intermittent pain even to the extent of collapse. This type of pain strongly resembles that associated with perforation, being distinguishable from it only by the subsequent course (no peritonitis sets in). With acute dilation of the stomach the pain is likewise extremely intense. Some degree of epigastric discomfort is present in the great majority of cases. In 3 cases reported in the literature (Fiedler, Minta, Schule) in which perforating gallstones had caused duodenal obstruction the patients were cured without surgical intervention and the heavy attacks of pain have been interpreted as a result of the perforation itself. This interpretation was confirmed by the occurrence of hemorrhagic vomiting some time later. The patients here to be reported on all suffered from pain, moderate in most cases, intense in only 1 (Case 4). Two of the cases (1 and 4) were peculiar in that the pain changed character, in Case 1 from a slight feeling of pressure to a more intense pain in the right side of the back and in Case 4 from typically biliary colic to pains occurring som time after meals and relieved by genucubital position. In Case 2 the pain, which occurred intermittently, was more intense but should perhaps be ascribed to the ulcer.

The statements of patients concerning vomiting differ widely, though vomiting is a frequent and fairly constant symptom. It ranges from 0 (Cases 2, 3 and 7) with slight nausea, occasional eructations and vomiting (as in Case 1) to persistent copious vomiting such as accompanies acute dilatation of the stomach. The vomitus may contain bile if the stenosis is infrapapillary, if suprapapillary stenosis is present it is free from bile.

Feces and flatus are unaffected by many of the chronic obstructions. Constipation may set in (Cases 2 and 7) as in the 3 aforementioned cases from the literature of perforating gallstones that healed without operation. Diarrhea may alternate with constipation or it may occur alone. The megaduodenum may cause a great deal of flatulence depending upon the degree of aerophagy which is most frequently present in this lesion. It has been mentioned that the patients often suffer from headache (Gillespie, Petrén, Schmieden), indeed this is such a prominent symptom that the French surgeons, e g Vilette, have actually spoken of "migraine duodénale" (Gillespie). This hemicranalgia is a symptom favoring the theories of the nervous origin of megaduodenum.

The absence of abdominal distention is a characteristic feature. In some cases there may be distention of the upper part of the abdomen, most frequently on the right (Cases 7 and 8). In 1 case (Case 9) distention occurred on the left. Even in newborn children this dilation of the right upper quadrant may be striking (Ladd, Lee) and peristalsis may be visible in the epigastrium (Benson and Grover). Acute dilatation of the stomach involves distention of the epigastrium which may later spread to the whole abdomen. In a few instances in which the obstruction has been caused by gallstones (Fiedler, Fleishhauer, Friedmann, Gollinger, Monrofit, Tupper) an intumescence has been palpable at the site of the gallbladder (Case 1), this intumescence disappeared later in some instances. There is often some tenderness of the epigastrium.

If the condition has persisted for any length of time the most constant symptom is emaciation, in practically all cases reported in the literature the patient was emaciated, often to an extreme degree, in the case reported by Hellstrom the weight had declined to 35 Kg. Emaciation was also striking in some of my own series (Cases 1, 5, 6 and 7). A remarkably low blood pressure has been mentioned by Vilette as a typical symptom.

It is typical of arteriomesenteric compression that the symptoms, especially pain, may disappear when the patient is in the lateral or genucubital position, or by means of pressure backward, upward and to the left on the abdomen above the umbilicus, a maneuver which according to Kellogg and Kellogg "unlocks the duodenojejunal kink." This was lucidly demonstrated in Cases 4 and 5. Elevation of the foot of the bed also appears to be of some value, as was stated by Beck. Some authors (Hurst-Hurst; Briggs; Rowland; Jones and Ryle) have found the symptoms most pronounced when the patient is in the erect position, whereas Lidström's case—in which the patient was suffering from a fractured crus—seems to show that the symptoms may be elicited simply by placing in the dorsal position a patient who had not previously shown any symptoms of gastric disease. In most cases a ventral position will give considerable relief (Rosenthal; Vilette; Wilkie).

Icterus does not belong to the syndrome proper, but it may occur if the occluding factor also involves the bile ducts (Case 7).

One of the patients of the American surgeon Lee presented thoracic symptoms referable to pressure from the dilated duodenum and stomach.

A symptom of great significance, to which the literature has not given the attention it deserves, is dehydration. Mayo-Robson has reported the case of a greatly dehydrated patient. In certain of the cases here to be reported (Cases 1 and 8) dehydration was suggested by the clinical picture, and in several (Cases 4, 6, 7 and 8) it was actually present. Mild acidosis has also been mentioned by Sheinfeld and Mackler, and in Crane's case "there was quite evidently a concentration of sanguine." Max Thorek called attention to this symptom at the Congress of Gastroenterologists in Paris in 1937 The dehydration accompanying high obstructions of the gastrointestinal canal has been lucidly dealt with in a series of Scandinavian works (Fleischer Hansen; Hoegh Guldberg; Leander; Schnor). We are faced with a triad of symptoms consisting of loss of chlorides, alkalosis and azotemia; Schnor of Denmark has mentioned that especially the loss of chlorides may have especial diagnostic significance. To these symptoms must be added an increase in the cell volume, the hemoglobin, the erythrocytes, serum protein and fibrinogen and viscosity, while the sedimentation rate declines. In Blake's case, published by Friedmann, the patient is said to have had cramps in the legs and fingers This suggested that dehydration and particularly alkalosis were rather intense. The diagnosis was established clinically as duodenal obstruction caused by gallstones

The general health of the patient was greatly affected in many cases (Cases 1, 4, 5, 7, and 8) and strikingly unaffected in others (Cases 2 and 3). As a peculiar instance may be mentioned Crane's 80-year-old patient, who walked into the doctor's office after a motor ride of 60 miles.

Roentgen examination—with or without a contrast medium—has given great assistance in correct diagnosis; it has been successfully employed even for the newborn (Benson and Grover; Clausen; Ehrenpreis; Ladd). It has also made information available concerning the nature of the obstacle. In the case of megaduodenum it will give the diagnosis immediately. In a series of cases of gallstone perforations, reported rather uniformly in the literature, a roentgenogram of the duodenal bulb has shown a great defect surrounded by a thin border of contrast medium (B. Andersen; Brocq; Brodin and Aime; Crane; Sheinfeld and Mackler). The same applies to the case of the present series. Beck, in cases of arteriomesenteric compression, emphasizes the lateral roentgenogram as an aid in localizing the duodenal obstruction.

In a few instances of gallstone perforations it has been possible to map out the very cholecystoduodenal passage (Fiedler; Mintz; Mayo-Robson; Schüle), although it must be presumed that in a number of cases this process does not give any symptoms at all (Mondor; Mayo-Robson). This is not the rule, however, and cannot be (Mondor). When symptoms have been present they have taken the form of intensive stabbing pain, thus resembling, initially, a free perforation; fever and muscular rigidity set in, and resistance may be felt at the site of the gallbladder, but the symptoms of diffuse peritonitis will fail to develop. Hemorrhage will be evident as melena, or it may bleed into the stomach, with subsequent hematemesis. The stone itself may pass into the stomach and be vomited, as has been mentioned by Petit in his classic description of 1743; it may be aspired from the stomach (Grundzach) or it may pass per anum, as in the cases reported by Fiedler, Mintz and Schüle.

To Be Continued in June Issue

Acute Cholecystitis: Preoperative Treatment

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THE GOSPEL of the preoperative care of patients suffering from the symptoms of acute cholecystitis cannot be repeated too often Upon this one point alone depends the separation of surgeons into two camps namely those who operate on these patients in the emergency and those who prefer to wait until the acute symptoms have subsided All can be operated on at the opportune time provided the gastrointestinal tract is put at rest To obtain physiological rest, it is important to starve the patient No food or liquids may be administered by mouth Instead the patient is fed parenterally up to 3 000 cc of fluid a day consisting of 5 or 10 per cent dextrose amigens and blood transfusions and continuous gastric suction is used if necessary Under this treatment no perforation of the gallbladder has ever been observed after the patient's admission to our surgical service Antibiotics play an important role especially in the prevention of infection by the Welch bacillus Penicillin aureomycin and sulfa products should be given routinely before and after operation

Laboratory Tests —While the patient is being prepared for operation essential laboratory tests should be performed No one should contemplate an operation of this kind without the knowledge of the levels of blood sugar blood urea and prothrombin time A sedimentation and a serum amylase test are of considerable help in selection of the opportune time for operation

Morbidity and Mortality —The object of all this preparation is to reduce the morbidity and the mortality If the patient is to be operated upon precipitously the safest procedure is a cholecystostomy This operation can be avoided by following the rules for preparation outlined above Again a cholecystostomy makes it imperative later to perform a cholecystectomy It has also been stated that more deaths occur after cholecystostomy than after cholecystectomy A one stage operation in any instance is preferable to a two stage affair on account of the shortened residence in the hospital and avoidance of the psychological upset of having to undergo two operations A cholecystectomy can always be performed if the symptoms are allowed to subside

In 126 consecutive cholecystectomies there were no deaths in 31 cases of acute cholecystitis At a recent meeting of one of the branch county societies a surgeon reported a 6 3 per cent mortality following cholecystectomy in 50 cases of acute cholecystitis soon after the patients were admitted to the hospital It would now be interesting for the same surgeon to use as a control the preoperative care that I have been advocating for many years and note the difference in morbidity and mortality It will be on the credit side of the ledger

Pathologist Versus Surgeon —Much has been written upon the subject of acute cholecystitis concerning the different opinions of the pathologist and the surgeon after the gallbladder has been removed Often the pathologist returns a report of chronic cholecystitis when as a matter of fact the physical signs before operation were those of an acute condition in the right upper quadrant of the abdomen In evaluating the type of gallbladder, I depend more upon the physical signs and symptoms of the patient than upon the pathologic report Even when the gallbladder is much thicker than normal, with gangrenous spots in it a report of chronic cholecystitis has often been returned by the pathologist Obviously, these gallbladders caused acute symptoms before they subsided and were put in a favorable condition for operation

Perforation —The fear that an acutely diseased gallbladder may perforate has been instilled into the younger surgeons and has led them to advocate the emergency operation There is absolutely no danger of perforation when the patient is placed under the care of a surgeon in the hospital This depends solely on the willingness of the surgeon to follow the outline of preoperative care as stated above Many surgeons do not reali [illegible] and that the gastrointestinal tract must be put at rest physiologically, thereby inhibiting the secretions of the bile passageways. I have encountered only 3 or 4 cases of perforation in forty years of active surgery. In all of them the patients were brought in in the perforated stage owing to ill-advised treatment in the home.

It is true that I have seen chronic perforations of the gallbladder to the stomach, duodenum, jejunum and even the common duct. The best treatment for a perforation is the prophylactic removal of the gallbladder with stones when the symptoms are apparent. Perforations of the gallbladder are often reported by the pathologist when the specimen reaches the laboratory. Many of these are not observed by the surgeon at the time of operation. Therefore, I believe that many of these perforations are artifacts. They may be due to injury of the gallbladder at the time of operation and to handling of the specimens in the laboratory. In a panel on acute disease of the gallbladder held in Washington, D. C., under the auspices of the American College of Surgeons, the pathologist reported 20 per cent of perforations after the specimens reached the laboratory. This is preposterous and helps to create a spirit of unrest among surgeons when a patient with acute cholecystitis comes under their care. In other words, this would call for more emergency treatment, which to my mind causes more deaths than waiting for the gallbladder to subside.

SUMMARY AND CONCLUSIONS

1. An outline is presented of the preoperative care of acute manifestations of the gallbladder.
2. Physiologic rest by starvation treatment is advocated; parenteral feeding is depended upon to maintain the fluid balance.
3. Under this regimen, perforations do not occur.
4. The opportune time for surgical intervention can be better determined after a report of laboratory observations had been made.
5. Morbidity and mortality are reduced, as evidenced by the fact that 31 consecutive patients with acute involvement were operated upon without a death.

RÉSUMÉ ET CONCLUSION

1. On présente un sommaire des soins préopératoires et des symptômes aigus de la vésicule biliaire.
2. On conseille le repos physiologique par le jeûne. L'alimentation par d'autres moyens que la voie digestive maintient l'équilibre des liquides du corps.
3. Aucune perforation ne survient durant cette méthode de traitement .
4. Le choix du moment propre à l'intervention chirurgicale sera déterminé après avoir reçu le rapport des examens de laboratoire.
5. La mortalité et le danger opératoire diminuent comme le prouve le fait que 31 malades présentant des symptômes aigus *furent opérés en suivant sans que se produise* d'issue fatale.

RESUMEN Y CONCLUSIONES

1. Se presenta un esquema del cuidado preoperatorio de los trastornos agudos de la vesícula biliar.
2. El reposo fisiológico por el tratamiento basado en el ayuno es recommendable, dependiendo de la alimentación parenteral para mantener el equilibrio de los humores.
3. Bajo este régimen no se presentan perforaciones.
4. El momento oportuno para la intervención quirúrgica puede determinarse del mejor modo después de haber realizado un informe de las observaciones de laboratorio.
5. Se reducen la morbilidad y mortalidad, lo que lo demuestra el hecho de que 31 pacientes consecutivos con complicaciones agudas pudieran operarse sin una sola muerte.

RIASSUNTO

1. Descrive la cura preoperativa nelle affezioni acute della cistifellea.
2. Consiglia il oligiuno quale riposo fisiologico per l'organo malato. Il ricambio idrico puo' essere mantenuto per via parenterale.
3. In queste condizioni non si determina piu' la perforazione della cistifellea.
4. Il tempo piu' oppertuno per l'operazione puo' essere desunto dai dati di laboratorio.
5. Questa linea di condotta diminuisce notevolmente la morbilita' e la mortalita'. Sopra 31 consecutive operazioni per affezioni acute della cistifellea non e' occorso un solo caso letale.

Sympathicoadrenal Surgical Regulation of Glycemia

PROF DR MANUEL A MANZANILLA, F I C S (HON)*
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MEXICO, D F , MEXICO

CLAUDE BERNARD[1] established the fact that normoglycemia represents the balance between the grade of production of dextrose and its utilization by the tissues The production of dextrose is hepatic and its utilization is mainly muscular[2] The regulatory mechanism includes endocrine and neurohormonal factors The fundamental principle of the regulation of dextrose is believed to be the result of biochemical tissue processes According to Soskin and his co workers,[3] the endocrine glands represent a closer state in the evolutionary scale of a more sensitive system In animals there is a peculiar state of dextrose regulation that persists even after suppression of all possible emergency regulator mechanisms This has been demonstrated after denervation of the liver,[4] the pancreas,[5] the adrenal medulla or the latter destroyed,[6] and also after total sympathectomy It seems that the vagoinsular and sympathicoadrenal agents constitute an emergency mechanism, while there are other factors that act continuously, such as the anterior portion of the hypophysis, the thyroid, the adrenal cortex and the pancreas The sympathicoadrenal system tends to raise the level of dextrose in the blood, so do the anterior portion of the hypophysis, the thyroid and the adrenal cortex, while the pancreatic vagoinsular system tends to lower it

Our investigation was made to determine glycemic variations in normal persons by anatomic or functional section of the splanchnic nerve and the application of this procedure as a treatment for diabetes mellitus, taking into consideration that the adrenal medulla is a paraganglion depending through said splanchnic nerve from the superior autonomic nervous centers and showing rare endocrine relations,[8] the epinephrine thus liberated being hyperglycemic and glycosuric in character[9]

Our experiments were based upon the function of the adrenal medulla of man in a condition of normal relaxation, as it appears to have been demonstrated that such function, in a condition of emergency, disappears through medulloadrenal suppression

EXPERIMENTS ON ANIMALS

We wish to mention the effects of medulloadrenal suppression upon glycemia and sensitivity to insulin, after medullectomy and denervation, in normal and diabetic animals The glycemic variations show the possible existence of epinephrine secretion during normal conditions, we say "possible," as it is well known that there are many different opinions on the subject Sensitivity to insulin provides an idea as to epinephrine secretion under emergency conditions[11] It rises in dogs[12] and cats[13] after unilateral medulloadrenalectomy and total contralateral adrenalectomy However, this does not produce glycemic variations in dogs,[14] even though low glycemic values during fasting have been observed, which probably disappeared later[15] Two or three weeks after medulloadrenalectomy the glycemic values tend to be lower than normal[6b] Adrenal denervation increases sensitivity to insulin in dogs[16] without showing glycemic variations,[17] nor have variations been observed after splanchnicectomy with lumbar or abdominal simpathectomy[18] In cats, splanchnicectomy also tends to raise sensitivity to insulin[19] In pancreatectomized dogs with diabetes, adrenal denervation ameliorates their condition,[20] decreasing or suppressing the output of epinephrine[21]

The interest of these experiments on animals lies in glycemic variations after adrenal denervation There are the data essentially related to our observations in man We have concluded from them that in animals, except in a few instances the adrenal medulla does

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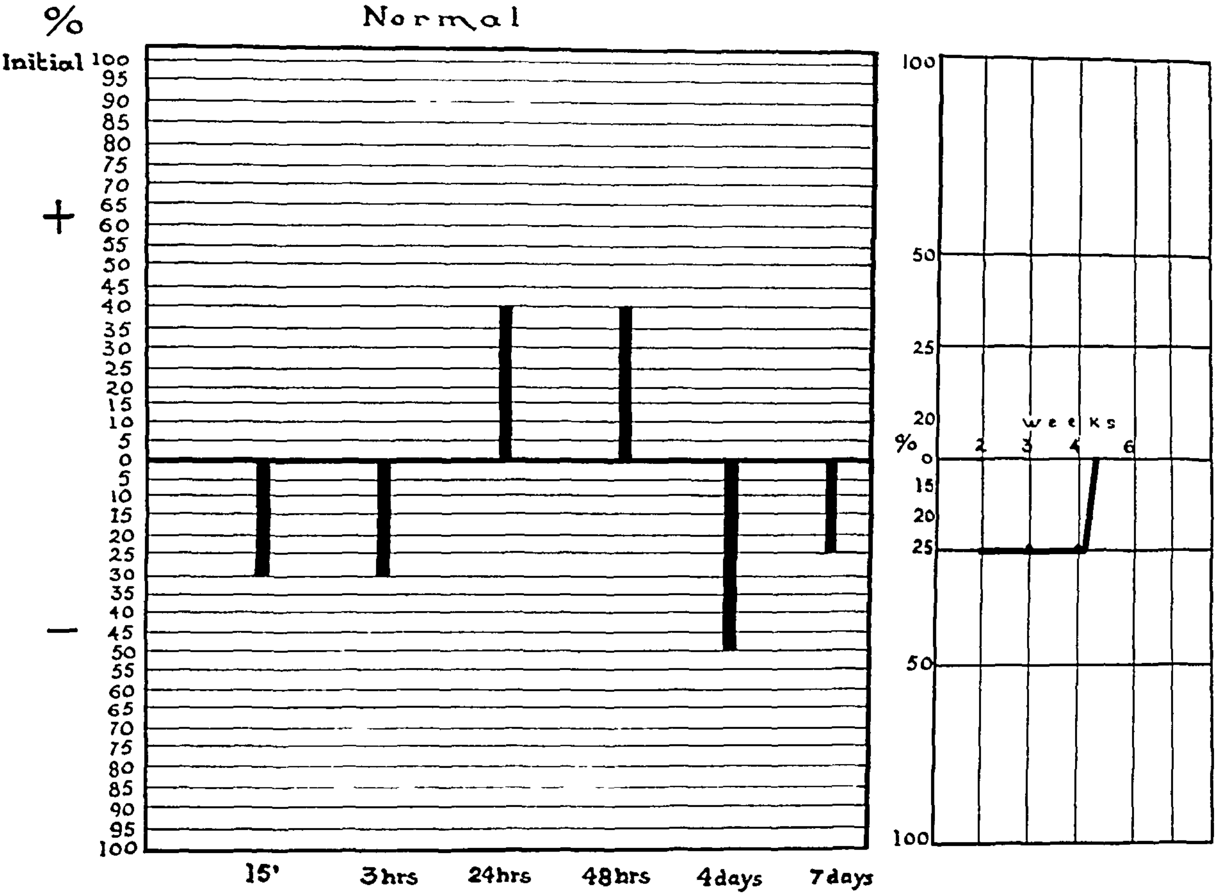

Fig. 1.—Glycemic curves for normal persons.

not seem to influence the glycemic levels during normal conditions.

OBSERVATIONS IN MAN

Corachan and Simarro[22] obtained favorable results in a case of diabetes mellitus after adrenal denervation.[23] Ciceri and Gabrielli performed functional section of the splanchnic nerve by alcoholization in 5 cases of diabetes mellitus, recording satisfactory results in three of them[24] and in further publications.[25] We must also mention the cases reported by Donati, Schmidt, Giordano, Crile, Manzanilla and others.[26] As regards man's sensitivity to insulin, it has been observed that after bilateral sympathectomy including the splanchnic nerve there have been no changes in any of the series of cases reported in the literature.[27]

We perform splanchnic functional section by alcoholization, following Alessandri and Valdoni. This acts not only upon the splanchnic nerves but upon the thoracic sympathetic system, depending on the state of diffusion shown by roentgenologic study,[28] as per tests confirmed by us in collaboration with Coqui. Adrenal denervation has been used as a surgical resource in certain cases, and supradiaphragmatic extraperitoneal splanchnicectomy is a common procedure.

Splanchnic functional section by alcoholization was performed on 50 normal adults and 60 diabetic adults with signs of active islet tissue, as per the clinical guide of Mosenthal.[29] Glycemic curves were plotted for both groups, showing averages in relation to percentages and considering as an indicator of the average for normal glycemia (Fig. 1) for diabetic hyperglycemia (Fig. 2).

RESULTS AND COMMENT

Without consideration of the transitory initial variations shown in Figure 1, we shall analyze the fundamental fact in both graphs, that is, the more or less lasting hypoglycemia. Let us consider that the hypoglycemia is the result of cessation of a continuous secretion of epinephrine, in so far as the method employed by us acts only upon the splanchnic pathway.

Houssay, Lewis and Foglia have inferred that the pancreas regulates the glycemic level by preventing hyperglycemia and hypoglycemia. Normoglycemia maintains the usual internal secretion of the pancreas, while hyperglycemia increases it and hypoglycemia acts as a moderator. In the dog transplantations of one to three pancreases brought about normoglycemia. This shows that the four pancreases secreted only as much insulin as one, moderating and adjusting their secretion in accordance with the glycemic level. Though large quantities of pancreatic tissue were added, it was not possible to diminish the glycemia.[8] These authors expressed the opinion that the moderating influence of the internal secretion of the pancreas depends on its extrinsic innervation, as the dogs into which pancreatic tissue was transplanted did not show any internal secretion.[11]

From our observations it may be thought that the hypoglycemic variations are partly compensated by the adjustor mechanism of the pancreas, which is demonstrated by the lesser intensity of hypoglycemia in normal persons than in diabetics. In the former the moderating property of insulin secretion probably acts because of the intensity of the hypoglycemia, while in the latter the intensity and thus the stimulus are less. Owing to the intensity of the hypoglycemia observed, we think that the pancreatic glycemic regulator mechanism in man is limited as respects the regulation of insulin secretion.

THERAPEUTIC USES

Since Opie's descriptions the association of pancreatic injury with diabetes has been considered common knowledge.[30] We are interested in correlating the known data concerning the effects of glycemic variations on pancreatic islet tissue in so far as splanchnicectomy decreases glycemia. It appears that the glycemic index is the stimulus for secretion of insulin,[7] and if this stimulus is intensive, as it is in the presence of diabetes mellitus, the pancreatic islet tissue is injured, especially the beta cells.[31]

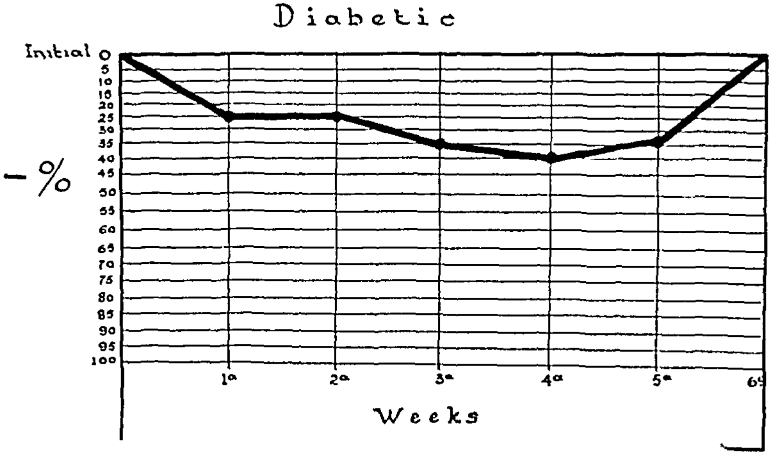

Fig. 2.—Glycemic curves for diabetic patients.

It is easy to understand, then, that if an intensive and uninterrupted stimulus produces anatomic degeneration and functional insufficiency of the beta cells, the glycemic drop caused by splanchnicectomy ameliorates the clinical picture of diabetes and diminishes the activity of islet tissue. In diabetic animals, children and obese patients, regeneration of tissue and functional pancreatic recuperation have been noted after lowering of the blood sugar level, which indicates the reversible nature of the lesions.[35] Therefore, splanchnicectomy as a therapeutic approach to diabetes would be indicated for those patients who still have functionally active pancreatic islet tissue, but not for those who require more than 30 to 40 units of insulin daily, since this indicates total damage.[36]

It is also indicated for certain types of neurogenic diabetes. Nevertheless, statistically these are not important; for them, the real value of splanchnic section lies in the prevention of islet tissue destruction and the probable stimulation of its regeneration in those cases in which there still is an active pancreas.

The use of this therapeutic measure will be intimately related to the evolutionary process of the disease and to the anatomic injuries and functional disturbances in the pancreas. From this we conclude that splanchnic section can be considered only on the basis of the fact that lowering of pancreatic islet tissue activity favors regeneration of the beta cells; the surgically produced drop in the blood sugar level is negligible because of its limited duration. Our opinion of its importance and utility in endocrinopancreatic regeneration is based upon experimental analogy.

SUMMARY

An investigation has been made of the hypoglycemic effects obtained after splanchnic section, either functional or anatomic, in 50 normal adults and in 60 diabetic patients.

The possible regeneration of pancreatic islet tissue is estimated by relative rest of the beta cells after the hypoglycemic effect.

The utility of this surgical measure in the treatment of pancreatic diabetes associated with remnants of active pancreatic islet tissue is discussed

RÉSUMÉ

L'auteur a fait l'étude des effets hypoglycémiques obtenus après la section du splanchnique, effets soit fonctionnels soit anatomiques, chez 50 adultes normaux et 60 malades diabétiques.

La régénération possible du tissu des ilôts pancréatiques est évalué par le repos relatif des cellules bêtas après l'effet hypoglycémique.

L'utilité de cette intervention chirurgicale dans le traitement du diabète pancréatique associé à des ilôts pancréatiques actifs aberrants, est discutée.

RESUMEN

Se investiga el efecto hipoglicémico obtenido por sección esplácnica, funcional o anatómica, en 50 adultos normales y en 60 diabéticos.

Se estima la posible regeneración del tejido insular pancreático por el reposo relativo de las células- beta consecutivo al efecto hipoglicémico.

Se examina la utilidad del recurso quirúrgico en el tratamiento de la diabetes pancreática con tejido insular remanente activo.

RIASSUNTO

Ha indagato l'ipoglicemia successiva alla sezione o al blocco dello splancnico in 50 soggetti normali ed in 60 diabetici. Una possibile rigenerazione del tessuto insulare del pancreas viene giudicata in base al riposo relativo delle cellule beta dopo l'effetto ipoglicemico.

L'A. discute l'utilita' di questo metodo operativo nella cura del diabete pancreatico associato a residui di tessuto insulare attivo.

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Friendship

Friendship consists in forgetting what one gives and remembering what one receives.—*Dumas*

No man is useless while he has a friend.—*Stevenson*

Friendship is the only cement that will ever hold the world together.—*Wilson*

If a man's friends are not all the world to him. he does not deserve that the world should hear of him.—*Anon*

If a man does not make new acquaintance as he advances through life, he will soon find himself alone. A man. sir. should keep his friendship in constant repair.
—*Johnson*

Sympathectomy and Plastic Operation

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THE first task in the surgical reconstruction of an extensive traumatic tissue defect is to make the ulceration surface heal enough to take the skin transplanted on it. Every surgeon who has treated conditions of this kind knows, however, that such preparatory treatment takes a long time and that skin transplantation may sometimes be attended by unpleasant surprises even with the best technic and care, especially when the foot is concerned.

Feeling that, in the majority of cases, the reason for the failure of skin transplantation when carried out *lege artis* may be found in poor blood supply, I have since 1945 regularly aimed at the improvement of circulation in the foot by performing lumbar sympathectomy prior to the skin transplantation. The actual impulsion to this method was given by the following case, in which a skin transplantation to the foot was followed by an interesting complication:

T. K., a worker 23 years old, trod on a mine in June 1942, which caused a tissue defect on the medial aspect of the left foot. In July 1943 a direct pedicle skin flap was transplanted to the site of the defect. It was a success, though on the upper and lower edges of the flap thin scar lines remained. The skin flap, transferred in the beginning of 1945, was destroyed spontaneously and without having caused any symptoms, leaving the former open ulceration behind. Therefore, in March 1946, a lumbar sympathectomy was performed. The desired effect soon appeared: The ulceration became clean and smaller. The last stage of the skin transplantation, with an abdominal tubed pedicle flap carried on the hand, was successfully performed in the following month.

Even though thin scar lines remained on the edges of the first skin flap, healing took place without any infection and the transplanted skin flap kept one and one-half years. And though, after that, infection may have contributed to the destruction of the flap, the main cause of it was without doubt insufficient blood supply to the surface of the ulceration. In its treatment, sympathectomy proved an excellent preliminary procedure before the skin transplantation was repeated.

Since then, in the Orthopedic Hospital of the Invalid Foundation, sympathectomy has been used in 21 cases of tissue defect of the leg and foot. In 9 of these the improving effect of this procedure on the blood supply led to complete scarring of the ulceration, with the result that the patients did not wish to undergo any further skin transplantation. In 12 cases, however, sympathectomy was followed by a skin transfer. In 2 cases the tissue defect was situated on the leg and in 10 cases on the foot. A few of the foot ulcers could be repaired by local plastic procedures, but in 4 cases the

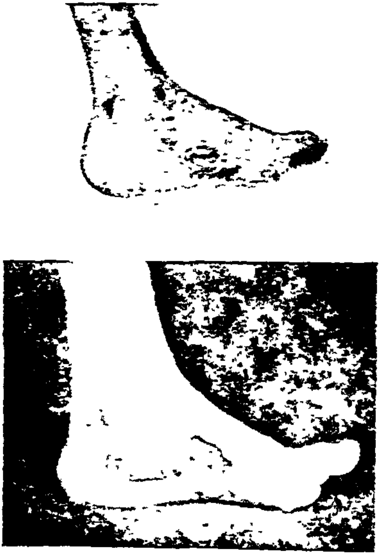

Fig. 1.—Result of skin transplantation in 1943. The transplanted skin remained as seen in the upper photograph for one and one-half years. Lower photograph shows same foot in 1945, the skin flap having undergone spontaneous destruction.

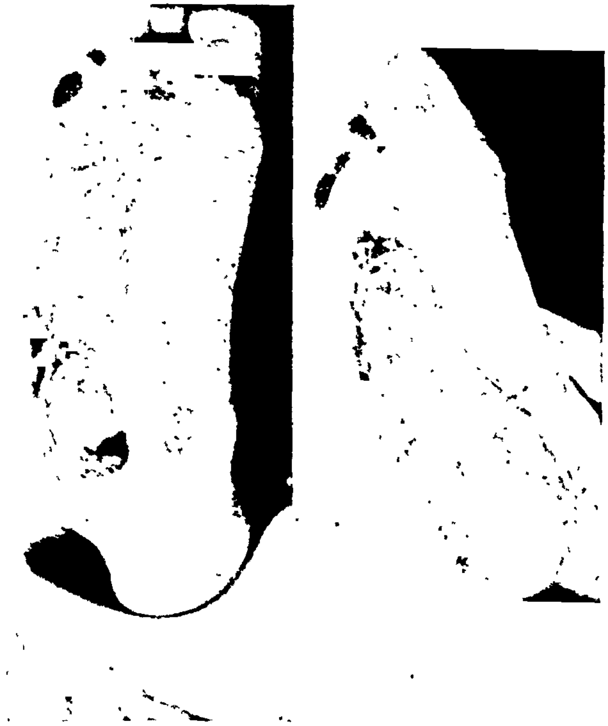

Fig. 2.—Extensive defect of sole before and after treatment.

direct skin pedicle flap method was used, and in 4 other cases an abdominal tubed pedicle flap was carried on the hand. The latter type of transfer has been used also in covering tissue defects of the leg.

As a rule sympathectomy has been performed immediately after treatment begins, in order to give the ulcer time to become clean and scarred either spontaneously or by means of free skin grafts, and to allow the scar tissue to be excised in due time and the skin pedicle flap transferred under as favorable circumstances as possible. If it has been found necessary to reserve an abdominal tubed pedicle flap for skin transplantation, sympathectomy has been performed through the same incision. Transplantation of the skin pedicle flap on a warm foot has always been aimed at. Therefore, even in cases in which the ulceration was already covered with scar when the patient began undergoing plastic treatment, sympathectomy has often been performed.

My experience shows that sympathectomy greatly promotes the reconstruction of extensive tissue defects of the leg and the foot. It has the following advantages: Ulceration becomes clean and scarred much more rapidly, either spontaneously or by means of free skin grafts; the transferred skin flap heals better, and the result of the skin transplantation is more durable.

The favorable effect of sympathectomy in vasomotor and trophic disturbances of the extremities was pointed out by Leriche as early as 1920. In the literature, however, I have found no reference to the successful application of this procedure to patients undergoing plastic surgical treatment. And the present short study, too, would probably never have been published had not Leriche, whom I told about my experiences, encouraged me to publish it.

RÉSUMÉ

Depuis 1945, l'auteur de cet article a préparé d'importantes pertes de tissus du pied et de la jambe à la greffe dermique par la sympathectomie lombaire. Cette méthode a les avantages suivants: l'ulcération se nettoie et se cicatrise plus rapidement, soit spontanément, soit par des greffes dermiques libres. Le lambeau de peau greffé se cicatrise mieux et le résultat de la greffe est plus durable.

RESUMEN

Desde 1945 el autor ha utilizado la simpatectomía lumbar para preparar la zona en donde existen extensas lesiones de los tejidos del pie y la pierna para practicar una transplantación o injerto cutáneo. El método tiene las siguientes ventajas: La ulceración existente es limpia y cicatriza con una rapidez mucho más considerable bien sea espontáneamente o mediante injertos cutáneos libres. El colgajo cutáneo transplantado se cura mejor, y el resultado de la transplantación cutánea es más duradero.

RIASSUNTO

Fin dal 1945 l'A. ha fatto precedere il trapianto della pelle sopra estesi difetti del piedi e della gamba da una simpatectomia lombare. La simpatectomia offrirebbe i seguenti vantaggi: ripulirebbe l'ulcerazione, mentre accelererebbe il processo cicatriziale spontaneo o successivo ai trapianti cutanei: il lembo cutaneo trapiantato guarirebbe meglio: i risultati a distanza del trapianto sarebbero piu' duraturi.

Recurring Giant Calculi of the Prostate
An Unusual Case

PROF DR J BITSCHAI, F I C S * AND G AXLER, M D †
ALEXANDRIA EGYPT

PROSTATIC calculi may be single or multiple and may vary greatly in size They are classified by Marion into two groups from the point of view of pathogenesis exogenous calculi, which consist of renal or vesical stones that lodge in a cavity of the prostate and increase in size by the addition of phosphatic salts as a result of the infection they produce and/or maintain The other group—the endogenous calculi—may form from urinary sediment in a pouch or abscess cavity in the prostate that communicates with the urethra, they may also develop in either a chronically infected prostate or a healthy one

The following case is presented because it has three exceptional features the great size of the stones, their extremely rapid recurrence in different forms and the youth of the patient

REPORT OF CASE

A 21 year-old man was admitted to our service in January 1946 with partial retention of urine chills and high fever of two weeks duration The patient had been aware of some heaviness in the perineum and rectum for several months There was frequency of urination with increasing difficulty in passing urine

The patient had had urinary bilharziasis in childhood He was stuporous with a temperature of 39 C, a dry tongue and a blood urea content of 52 mg per hundred cubic centimeters The vesical dullness extended to a point midway between the upper border of the pubis and the umbilicus Rectal examination disclosed a stony hard mass the size of a grade III hypertrophy in the region of the prostate Crackling could be elicited A simple flat roentgenogram of the urinary system showed the presence of four chestnut sized highly calcified stones in the prostatic region and a small pea sized calculus in the lower part of the left ureter (Fig 1)

Infusions and antibiotics were given The general condition improved. On the third day after admission a suprapubic cystotomy was performed with peridural novocaine anesthesia There were no stones in the bladder The stones were found in a large pouch in the posterior urethra, from which they were dislodged with great difficulty After their removal the prostatic cavity was felt to be contracting as after enucleation of a prostatic adenoma The patient slowly recovered and two months later was discharged cured a control roentgenograms having shown no stones in the prostatic region

In September 1948 two and one half years later, the patient was readmitted to the hospital, complaining of inability to pass urine except 'by inserting a finger in the rectum There was steadily increasing dysuria with perineal heaviness, and he had passed numerous small stones and much gravel in purulent urine for two months Five days before admission he had had chills and a high fever He had no complaints referable to defecation

Physical examination showed him to be emaciated, anemic, toxic and in great distress The tongue was dry The temperature was 38 9 C The suprapubic scar was tense and the bladder bulged conspicuously under it It extended 10 cm above the pubis and was extremely tender, as was also the perineal region Rectal examination was painful The prostate was found to be a stone-hard homogeneous mass the size of a small orange The value for blood urea was 62 mg, and the urine contained 130 mg of albumin per hundred cubic centimeters

On admission a No 10F silk woven catheter was introduced with great difficulty The urethra was felt to be 'paved with stones Thick, purulent urine could be aspirated with great difficulty The patient was given penicillin, sulfatherapy and infusions His temperature came down On the third day of hospitalization a suprapubic urinary fistula developed spontaneously through the scar of the previous operation A suprapubic catheter was inserted to facilitate drainage

A flat film of the urinary system showed the uniform shadow of a highly calcified stone in the prostatic region (Fig 2) It was heart shaped, 7 by 4 zed stone in

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From the Department of Urology Cozzika Hospital Alexandria

* Chief Urologist, Visiting Professor of Urology Farouk I University Faculty of Medicine

† Resident in Urology

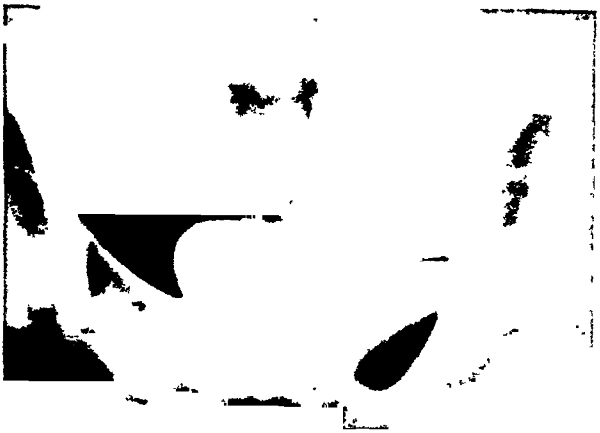

Fig. 1—Plain roentgenogram showing prostatic stones (January 1946).

lower part of the left ureter had disappeared.

Six days later a perineal prostatotomy was performed with sacral and pentothal anesthesia, and a stone measuring 7 by 5 by 3 cm. was removed intact. The dissection was difficult on account of adhesions. The prostate was entirely replaced by the stone. A urethral catheter was inserted. The postoperative condition of the patient was good. On the third postoperative day the temperature was 36.8 C. and the perineum was dry. The urethral catheter was removed and a de Pezzer catheter introduced through the suprapubic fistula. Nine days after the operation the urethral catheter was reintroduced and fixed with continuous suction drainage, and a week later the area was dry, the suprapubic fistula having closed completely and the perineal wound having healed per primum. The patient was discharged three weeks after the operation. He could pass urine easily, in a good stream, 200 cc. at a time. The stone was composed of calcium and ammonium phosphates and urates (Fig. 3). The value per hundred cubic centimeters for serum calcium was 11.5 mg., for plasma phosphorus 2.7 mg., and for uric acid 5.5 mg.

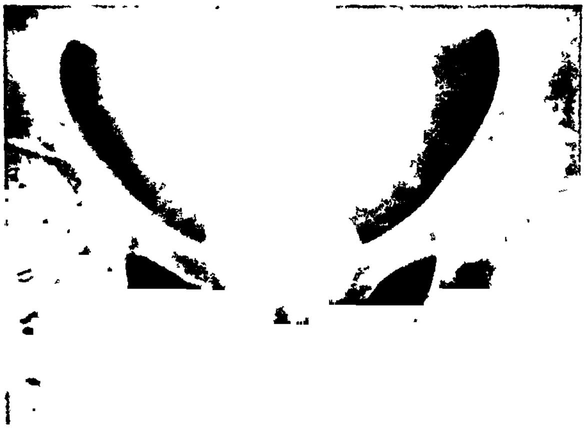

Fig. 2—Plain roentgenogram taken in September 1948, showing prostatic stone.

COMMENT

The main features of the case are the size of the stones and the fact that they recurred so rapidly. Three main factors in pathogenesis are to be noted: first, that the stones formed in a congenital pouch of the prostatic portion of the urethra. Second, this formation was aggravated by bilharziasis—in what way exactly it is difficult to say, perhaps by favoring urinary infection. In this connection it is interesting to note the not infrequent association of prostatic calculi with genitourinary tuberculosis, which, like bilharziasis, produces pathologic changes in the tissues such as tubercles, ulcers and calcifications. Third, there was a metabolic defect that could not be well defined. The patient's serum calcium level was slightly elevated, but his inorganic phosphorus level was normal and so was the uric acid content of the serum. The parathyroids were not enlarged, and the bones were normally calcified. The patient also had recurring stones in his left kidney. The fate of the stone in the lower part of the left ureter could not be traced because the patient—an uneducated peasant—did not turn up for a recheck as recommended. It is possible, however, that this stone became lodged in the prostatic cavity left after removal of the calculi in the first operation. This ureteral stone may have acted as a nucleus for the formation of the second prostatic stone. According to Winsbury-White, prostatic stones are associated with stones elsewhere in the urinary tract in one-third of all cases. This author has pointed out the importance of considering the close association of urinary lithiasis and prostatic disease in general. In the present case, however, the condition of the prostate could not be assessed, as it was reduced at the time of the operation to a mere shell 0.25 cm. in thickness.

The sexual power of the patient was unimpaired; he was surprised when asked whether he had normal intercourse and ejaculation. His wife had borne him a son, who was 2 years old on the father's second admission to the hospital. This retained sexual power can be compared with that following transurethral prostatectomy, and actually this is what his condition amounted to; after the suprapubic

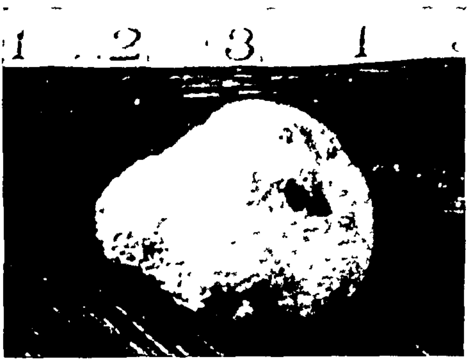

Fig 3—Prostatic stone removed by perineal prostatotomy in September 1948 (measured in inches)

removal of the stones in the first operation the prostatic bed was felt to be contracting indicating that prostatic tissue was still present At the second operation there was nothing but a thin fibrous tissue capsule

As to the treatment the suprapubic route was chosen the first time, because the stones were partly intravesical In the second operation the perineal approach was thought best for several reasons first, the stone was mainly extravesical, second it was single and it would have been difficult to remove it in one piece from above, especially as it was wider in its upper portion Perineal operation was also favored because it permits better drainage Moreover, the acute inflammatory condition of the suprapubic region contraindicated any approach from above In the first operation small pieces may have been left behind—although the control roentgenogram revealed no abnormality—and formed the nucleus of the second stone

The perineal operation also has the advantage of being less shocking and the patient's general condition was particularly poor at the time of operation The postoperative course was uneventful and he made a much more rapid recovery than after the suprapubic cystostomy The capsule was left behind and therefore this procedure was not as nearly ideal as Henline s subtotal prostatectomy but the latter was impracticable on account of the presence of numerous adhesions

A cavity being left behind the chances that calculi will recur in this patient depend on how well the cavity is draining into the posterior urethra

RESUME

Un cas insolite de calculs géants récidivants de la prostate chez un homme de 21 ans est mentionné Deux opérations furent exécutées l'une par voie suspubienne et l'autre (pour récidive deux ans et demi après) par voie périnéale Cette dernière paraît préférable

RESUMEN

Se presenta un caso de un calculo gigante recurrente de la prostata en un paciente de 21 años Se le practicaron dos intervenciones, una por via subpubica y otra (para tratar una recaída acaecida dos años y medio más tarde) por via peritoneal considerándose que esta ultima vía es la preferida

RIASSUNTO

Descrive un caso insolito di calcolo gigante recidivante della prostata in un uomo di 21 anni Il calcolo e' stato asportato la prima volta mediante un operazione soprapubica la seconda volta (2 anni ½ dopo) per via perineale L'A ritiene che q [illegible] preferibile

Sección en Español

Una Nueva Filosofia de la Investigación Cientifica

DR. FÉLIX MARTÍ IBÁÑEZ
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LAS ventanas iluminadas han desempeñado un papel trascendental en la historia de la Humanidad. El hombre gustó siempre de ornamentar templos y mansiones con ventanales de vidrios pintados de colores a través de los cuales el sol chispeaba andrajos de oro. púrpura y añil sobre el suelo de palacios y catedrales. A los últimos tiempos del arte preconstantiniano corresponden los famosos vidrios con dibujos en oro y el disco con tres retratos sobre fondo azul oscuro que decora la cruz de plata expuesta en el Museo de Brescia. El arte cristiano medioeval es un bordado de estampas de la Pasión sobre los vidrios de las grandes catedrales. Ayer y hoy, el creyente o el artista se deleitaron viendo al sol encender una verbena chispeante de rubíes y onzas doradas en las sedas y tisús de las princesas, y en las barbas floridas de los santos que pueblan las ventanas iluminadas. El ser humano agregó así a la piedra, el incienso y la plata de sus templos, una joyería de arco iris, aprisionando sus colores en los mantos y cabelleras de toda esa mística humanidad que esmalta las vidrieras de las catedrales.

En la casa de la Fundación Mayo, en Rochester. Minesota. Estados Unidos de Norteamérica. de noble abolengo y tradición hospitalaria para el visitante hispanoamericano. hay un ventanal iluminado. Se instaló en Marzo de 1943 en la ventana del Este del salón en el tercer piso usado para las reuniones de las sociedades médicas. quirúrgicas y de laboratorio e investigación. Un comité de altas personalidades científicas y arquitectos. dirigió la instalación de dicha vidriera iluminada. En ella está representada en doce paneles toda la historia de la Medicina—hombres. instituciones. acontecimientos—en su triple aspecto de práctica profesional. enseñanza médica e investigación científica Esta última se presenta desde 500 a.d.J.C a 1.500 a d.J.C en un panel donde un alquimista medioeval trabaja en su laboratorio extrayendo zumos medicinales de las plantas y buscando la piedra filosofal y la panacea universal. el triple objetivo de astrólogos y curanderos de la época. De 1500 a 1800. se simboliza la época de las teorías, sistemas y experimentos en la figura de Harvey. en vidrio azul. plata y bermellón. demonstrando al rey Carlos I de Inglaterra, el aparato circulatorio. Las sombras de Bacon. Hunter. Galvan y Volta le rodean y la frase de Claudio Bernard. "Cuelga tu imaginación con el sombrero en la percha al entrar en el laboratorio. para recogerla al marcharte" es timón de su obra. En otro panel—1800 a 1900—Pasteur rodeado de sus ayudantes y fieles animalitos domésticos lleva adelante la obra de reorganización de los métodos científicos de la que fueron pioneros Bernard. Koch y Beaumont. Desde 1900. la era de la Medicina preventiva, es el tema de otro panel. Dos estudiantes están usando el microscopio electrónico. La Física, Química. Biología y Roentgenología se unen en el campo de la Medicina preventiva. Algunos libros esparcidos en el laboratoria demuestran la continuidad del saber en el tiempo y el espacio.

El sol americano que ilumina a través de ese ventanal histórico los rostros de los médicos de las Américas allí reunidos para estudiar y hablar de Medicina. trae la luz de treinta siglos. Paralelamente al médico que cura y al maestro que enseña. viven en el vidrio iluminado. los investigadores que descubren. El próximo acto de curar se ha descompuesto. como la luz blanca a través de las facetas de un prisma. en tres ramas diferentes: Práctica. enseñanza e investigación. De esta última faceta deseamos hablar hoy. de la que Robert Patterson ha dicho que era "esa estentórea voz nueva de la ciencia y la tecnología" que resuena en todos los confines del mundo civilizado.

Hablar de investigación científica es ante todo definir el objeto de nuestro estudio Si lo desnudamos de toda la hojarasca adventicia para considerarlo en su tiritante desnudez conceptual, nos apercibimos de que la investigación científica, nuestra principal herramienta de exploracion del universo, tiene como base el experimento reproducible, y que de una etapa de lógica e investigación pura, pasa a otra subsiguiente, de aplicacion y metodologia No es un arte puro porque rechaza la soberania de la intuicion, ni es matematica porque antepone el experimento a la estadistica Tiene como ultima finalidad y objetivo el mismo de la civilizacion moderna Prolongar la vida y mejorar la salud eliminando las causas de invalidez y muerte, para facilitar al ser humano su triunfo integral sobre el medio ambiente

La Medicina como ciencia, es a la vez erudicion—hechos, principios, teorias, métodos y reglas—y tambien acción Es decir, teoria y practica Tiende a adquirir nuevos conocimientos y metodos mediante el estudio y observacion, a transmitirlos, por la enseñanza, y a aplicar estos metodos a la creacion de un arte de vivir con salud Investigación, enseñanza y practica médica son por tanto los tres peldaños de alabastro en la regia escalinata de la Medicina El medico practico, depositario del arte de curar, lo aplica como artista a mejorar la salud de los hombres y de los pueblos El maestro médico tiene como objetivo legar su caudal de erudición al estudiante El investigador se ocupa de animales y sustancias químicas en su laboratorio, de enfermos en clinicas y hospitales de estudio, y de poblaciones en las estadisticas de tipo social Simbolo del medico practico devoto de la Medicina como arte—*ars medendi*—son Hipócrates y Sydenham, como Haller y Osler son encarnacion del maestro que hace de la Medicina, disciplina pedagógica universitaria y Harvey y Finlay personifican al investigador que hace de la Medicina, ciencia pura Los tres batallan desde la misma trinchera contra los tres eternos enemigos de la Humanidad Enfermedad—o sea dolor—vejez y muerte, cuya visión fué la voz que orientó la vocación mística de medico de almas de Gantama el Buda

Con el desgranar inacabable de los días, la Medicina se ha ido transformando apoyada por la investigación, en un arte de prevención y profilaxis El papel desempañado por la investigación científica a este respecto, ha sido incalculable En los comienzos, el mago y el hechicero no investigan las causas de la enfermedad, ya que hacerlo sería ofender a los demonios causantes Cuando el sacerdote reemplaza al mago, todavía en los templos de Apolo y Esculapio, entre la blanca geometría de los marmoles, el arte de curar convertido en culto y ritual es finalidad exclusiva de la Medicina En Grecia, el filósofo sustituye al sacerdote y con aquel se inicia la investigación en la Medicina, y su paso de arte de curar, a ciencia aplicada Luego, Demócrito introduce el átomo como urdimbre sutil de todo lo existente, Alcmeon reivindica el papel del cerebro como asiento de la inteligencia, Empédocles establece la doctrina humoral, Sócrates hace al hombre—no al universo—sujeto filosófico, Platon asienta los fundamentos de la Medicina psicosomatica al indicar la unidad de cuerpo y alma, Aristoteles inicia la Biología científica e Hipócrates da a la Medicina una filosofia propia, completada por Galeno al usar el experimento como base de las doctrinas médicas

La Edad Media, no representa un retroceso en todo el saber médico Cierto es que las estrellas de la Astronomia se convierten en luceros de simbolismo astrologico y que las probetas del quimico se trocan en los febriles crisoles del alquimista en busca de la piedra filosofal Mas las catedrales se hacen templos del estudio donde se traducen y escancian moldes occidentales las esencias del clasico, y los arabes adelantan en la farmacologia Después, la llamarada renacentista Copérnico, Vesalio y Descartes resucitan el espiritu platónico de la investigación, Gilbert enuncia el magnetismo y Harvey la circulacion de la sangre En los siglos ulteriores pasado el furor iatroquimico e iatrofisico de Willis y Pitcairne—Sydenham y Boerhaave reivindican el aspecto humano de la Medicina, John Hunter, el titán escocés, demuestra el valor de la Anatomía patológica en la investigación médica A él se debe la frase famosa en una carta a su amigo Edward Jenner, el descubridor de la vacuna· ¿Por qué pensar? ¿Por qué no probar el experimento? Hunter anticipa el pensamiento científico moderno al unir la Medicina y la Biología sobre su mesa de disección anatómica

todo definir el objeto de nuestro estudio, si lo desnudamos de toda la hojarasca accesoria para considerarlo en su íntima [illegible] conceptual, nos apercibimos de que la investigación científica es nuestra principal herramienta de exploración del universo. Tiene como base el experimento reproducible y tiene una etapa de lógica e investigación pura y una otra subsiguiente de aplicación práctica. No es un arte puro porque no [illegible] de la intuición, ni es [illegible] pone el experimento a la estadística. Tiene como última finalidad el progreso [illegible] de la civilización moderna. Promover la salud y mejorar la salud eliminando las causas de enfermedad, invalidez y muerte para brindar al ser humano su triunfo integral sobre su medio ambiente.

La Medicina como empresa —a la vez ciencia— desde sus primeros pasos [illegible] y regla— y también arte. Es, pues, teoría y práctica. Tiende a adquirir nuevos conocimientos y métodos mediante el estudio y la observación, a transmitirlos por la enseñanza, y a aplicar estos métodos a la creación de un arte de vivir en salud. Investigación, enseñanza y práctica médica son por tanto los tres peldaños de ascenso en la remontada escalinata de la Medicina. El médico práctico, depositario del arte de curar, lo aplica como artista a mejorar la salud de los hombres y de los pueblos. El maestro médico tiene como objetivo legar su caudal de erudición al estudiante. El investigador se ocupa de animales y substancias químicas en su laboratorio, de enfermos en clínicas y hospitales de estudio y de poblaciones en las estadísticas de tipo social. Símbolo del médico práctico dentro de la Medicina como arte—arte moderno—son Hipócrates y Sydenham, como Haller y Osler son encarnación del maestro que hace de la Medicina disciplina pedagógica universitaria, y Harvey y Finlay personifican al investigador que hace de la Medicina ciencia pura. Los tres batallan desde la misma trinchera contra los tres eternos enemigos de la Humanidad: Enfermedad—o sea dolor—vejez y muerte, cuya unión fué la voz que orientó la vocación mística de médico de almas de Gautama el Buda.

Con el devenir insaciable de los días, la Medicina se ha ido transformando, apoyada por la investigación, en un arte de prevención y [illegible]. El papel desempeñado por la investigación científica a este respecto. Ha sido [illegible]. En [illegible] el mar y el [illegible] las cartas de la en[illegible] a los [illegible]. Creyendo [illegible] al mar [illegible] en los templos de [illegible] y Esculapio [illegible] la Física [illegible] de la Medicina. En Grecia el [illegible] en la Medicina [illegible] el arte de curar a [illegible]. Demócrito, [illegible] de la [illegible]. Platón [illegible] la Medicina [illegible] al [illegible] la unidad de cuerpo y alma. Aristóteles funda la Biología científica. Hipócrates da a la Medicina una [illegible] por Galeno al [illegible] el experimento como base de las doctrinas médicas.

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LAS ventanas iluminadas han desempeñado un papel trascendental en la historia de la Humanidad. El hombre gustó siempre de ornamentar templos y mansiones con ventanales de vidrios pintados de colores a través de los cuales el sol chispeaba andrajos de oro, púrpura y añil sobre el suelo de palacios y catedrales. A los últimos tiempos del arte preconstantiniano corresponden los famosos vidrios con dibujos en oro y el disco con tres retratos sobre fondo azul oscuro que decora la cruz de plata expuesta en el Museo e Brescia. El arte cristiano medioeval es un dado de estampas de la Pasión sobre los ios de las grandes catedrales. Ayer y hoy, creyente o el artista se deleitaron viendo al al encender una verbena chispeante de rubíes y onzas doradas en las sedas y tisús de las princesas, y en las barbas floridas de los santos que pueblan las ventanas iluminadas. El ser humano agregó así a la piedra, el incienso y la plata de sus templos, una joyería de arco iris, aprisionando sus colores en los mantos y cabelleras de toda esa mística humanidad que esmalta las vidrieras de las catedrales.

En la casa de la Fundación Mayo, en Rochester, Minesota, Estados Unidos de Norteamérica, de noble abolengo y tradición hospitalaria para el visitante hispanoamericano, hay un ventanal iluminado. Se instaló en Marzo de 1943 en la ventana del Este del salón en el tercer piso usado para las reuniones de las sociedades médicas, quirúrgicas y de laboratorio e investigación. Un comité de altas personalidades científicas y arquitectos, dirigió la instalación de dicha vidriera iluminada. En ella está representada en doce paneles toda la historia de la Medicina—hombres, institu- [illegible] descubrimientos—en su triple aspecto de [illegible] profesional, enseñanza médica e investigación científica. Esta última se pre- [illegible] d.J.C. a 1500 d.J.C. en un [illegible] medioeval trabaja en su laboratorio extrayendo zumos medicinales de las plantas y buscando la piedra filosofal y la panacea universal, el triple objetivo de astrólogos y curanderos de la época. De 1500 a 1800, se simboliza la época de las teorías, sistemas y experimentos en la figura de Harvey, en vidrio azul, plata y bermellón, demonstrando al rey Carlos I de Inglaterra, el aparato circulatorio. Las sombras de Bacon, Hunter, Galvan y Volta le rodean y la frase de Claudio Bernard, "Cuelga tu imaginación con el sombrero en la percha al entrar en el laboratorio, para recogerla al marcharte" es timón de su obra. En otro panel—1800 a 1900—Pasteur rodeado de sus ayudantes y fieles animalitos domésticos lleva adelante la obra de reorganización de los métodos científicos de la que fueron pioneros Bernard, Koch y Beaumont. Desde 1900, la era de la Medicina preventiva, es el tema de otro panel. Dos estudiantes están usando el microscopio electrónico. La Física, Química, Biología y Roentgenología se unen en el campo de la Medicina preventiva. Algunos libros esparcidos en el laboratoria demuestran la continuidad del saber en el tiempo y el espacio.

El sol americano que ilumina a través de ese ventanal histórico los rostros de los médicos de las Américas allí reunidos para estudiar y hablar de Medicina, trae la luz de treinta siglos. Paralelamente al médico que cura y al maestro que enseña, viven en el vidrio iluminado, los investigadores que descubren. El próximo acto de curar se ha descompuesto, como la luz blanca a través de las facetas de un prisma, en tres ramas diferentes: Práctica, enseñanza e investigación. De esta última faceta deseamos hablar hoy, de la que Robert Patterson ha dicho que era "esa estentórea voz nueva de la ciencia y la tecnología" que resuena en todos los confines del mundo civilizado.

Hablar de investigación científica es ante todo definir el objeto de nuestro estudio Si lo desnudamos de toda la hojarasca adventicia para considerarlo en su tiritante desnudez conceptual, nos apercibimos de que la investigación científica, nuestra principal herramienta de exploracion del universo, tiene como base el experimento reproducible, y que de una etapa de logica e investigacion pura pasa a otra subsiguiente, de aplicacion y metodologia No es un arte puro porque rechaza la soberanía de la intuicion ni es matematica porque antepone el experimento a la estadística Tiene como ultima finalidad y objetivo el mismo de la civilizacion moderna Prolongar la vida y mejorar la salud eliminando las causas de invalidez y muerte, para facilitar al ser humano su triunfo integral sobre el medio ambiente

La Medicina como ciencia, es a la vez erudición—hechos principios teorias, métodos y reglas—y tambien accion Es decir, teoría y práctica Tiende a adquirir nuevos conocimientos y metodos mediante el estudio y observación, a transmitirlos, por la enseñanza, y a aplicar estos métodos a la creación de un arte de vivir con salud Investigación, enseñanza y practica médica son por tanto los tres peldaños de alabastro en la regia escalinata de la Medicina El médico practico, depositario del arte de curar, lo aplica como artista a mejorar la salud de los hombres y de los pueblos El maestro médico tiene como objetivo legar su caudal de erudición al estudiante El investigador se ocupa de animales y sustancias quimicas en su laboratorio, de enfermos en clinicas y hospitales de estudio, y de poblaciones en las estadisticas de tipo social Símbolo del médico practico devoto de la Medicina como arte—*ars medendi*—son Hipócrates y Sydenham, como Haller y Osler son encarnacion del maestro que hace de la Medicina, disciplina pedagogica universitaria, y Harvey y Finlay personifican al investigador que hace de la Medicina ciencia pura Los tres batallan desde la misma trinchera contra los tres eternos enemigos de la Humanidad Enfermedad—o sea dolor—vejez y muerte, cuya visión fué la voz que orientó la vocación mística de médico de almas de Gantama el Buda

Con el desgranar inacabable de los días, la Medicina se ha ido transformando, apoyada por la investigacion, en un arte de prevención y profilaxis El papel desempañado por la investigación científica a este respecto, ha sido incalculable En los comienzos, el mago y el hechicero no investigan las causas de la enfermedad, ya que hacerlo sería ofender a los demonios causantes Cuando el sacerdote reemplaza al mago, todavía en los templos de Apolo y Esculapio, entre la blanca geometría de los mármoles, el arte de curar convertido en culto y ritual es finalidad exclusiva de la Medicina En Grecia, el filósofo sustituye al sacerdote y con aquel se inicia la investigación en la Medicina, y su paso de arte de curar, a ciencia aplicada Luego, Demócrito introduce el atomo como urdimbre sutil de todo lo existente, Alcmeon reivindica el papel del cerebro como asiento de la inteligencia, Empédocles establece la doctrina humoral, Sócrates hace al hombre—no al universo—sujeto filosófico, Platón asienta los fundamentos de la Medicina psicosomática al indicar la unidad de cuerpo y alma, Aristoteles inicia la Biología científica e Hipócrates da a la Medicina una filosofía propia, completada por Galeno al usar el experimento como base de las doctrinas médicas

La Edad Media, no representa un retroceso en todo el saber médico Cierto es que las estrellas de la Astronomía se convierten en luceros de simbolismo astrologico y que las probetas del químico se trocan en los febriles crisoles del alquimista en busca de la piedra filosofal Mas las catedrales se hacen templos del estudio donde se traducen y escancian en moldes occidentales las esencias del saber clásico, y los árabes adelantan en la farmacologia Después, la llamarada renacentista Copérnico, Vesalio y Descartes resucitan el espíritu platónico de la investigación, Gilbert enuncia el magnetismo y Harvey la circulación de la sangre En los siglos ulteriores, pasado el furor iatroquímico e iatrofísico de Willis y Pitcairne—Sydenham y Boerhaave reivindican el aspecto humano de la Medicina, John Hunter, el titán escocés, demuestra el valor de la Anatomía patológica en la investigación médica A él se debe la frase famosa en una carta a su amigo Edward Jenner, el descubridor de la vacuna· ¿Por qué pensar? ¿Por qué no probar el experimento? Hunter anticipa el pensamiento científico moderno al unir la Medicina y la Biología sobre su mesa de disección anatómica

En el siglo pasado, la verdadera naturaleza de la investigación científica, se alumbra completamente al descorrerse un cortinaje y entrar en el escenario Claudio Bernard. El padre de la Fisiología moderna, estableció las estapas de toda investigación científica: observación, hipótesis y comprobación experimental. Su filosofía, expresada en su "Introducción al estudio de la Medicina experimental" es un estudio clásico que desde 1865 ha orientado el pensar del investigador moderno

Nuestro siglo representa un trampolin desde el que la investigación médica se ha zambullido de lleno en un océano estrictamente científico. La excesiva especialización existente en el orden del arte médico está compensada por una tendencia a la síntesis en el campo de la investigación Las especialidades están reagrupándose bajo nuevas banderas, tan nuevas que como en el caso de la unión de la Neuropsiquiatría, solo son nuevas porque de tan desteñidas por el sol de los siglos no pueden verse los viejos colores. Hay un grito de integración y universalismo flotando en los aires de los laboratorios El cerebro del investigador está comenzando a ser un pequeño firmamento con un sol central de interés en un tema, pero con muchos astros en su derredor de intereses científicos diversos. El investigador—pasada la fase de su pensamiento ochocentista puramente microquímico y analítico—ha vuelto a ser un filósofo. Mas su filosofía es la de investigar con un pensamiento amplio y libre y un propósito de aplicación de sus descubrimientos al arte de curar. Fleming—investigador puro—dió a Florey con la penicilina, la herramienta mágica con que labrar una página inmortal en el arte médico El investigador médico que estudia anatomía patológica sabe que como Osler recomendó, el hospital y la Facultad de Medicina se centran en torno al humilde mármol de su mesa de autopsias Cada investigador no puede ya ignorar lo que está pasando en otros campos de la ciencia moderna Un [illegible] espíritu de colaboración une a los investigadores en [illegible] dominio de la Medicina [illegible] trabajo de físicos, bacteriólogos [illegible] surgido el portentoso [illegible] La obra conjunta de [illegible] y clínicos ha descubierto las nuevas sulfamidas. Micólogos y veterinarios, químicos y farmacólogos están arrancando a la esfinge de la Naturaleza, el secreto de sus antibióticos. El saber acumulado de entomólogos, parasitólogos y biólogos está dando los nuevos antipalúdicos. A la penicilina, los bancos de sangre, el ácido fólico, las globulinas sanguíneas, las nuevas técnicas de neurocirugía, el suero antirretículoendotelial, la nueva física electrónica de laboratorio, se unen otros descubrimientos sensacionales. Se tratan las úlceras gástricas mediante aminoácidos hidrolizados; la fiebre moteada de las montañas Rocosas por el ácido paraaminobenzoico, se descubre el mecanismo por el que la insulina libera hexoquinasa de la hipófisis anterior, se ensaya la estreptomicina en la tuberculosis, se trata satisfactoriamente el cólera por el plasma hemático y las tripanosomiasis por el ácido gama butírico, se usa la gelatina blancuzca que impurifica las tuberías en las fábricas de azúcar en vez de plasma en casos de shock y se transplantan corazones en animales de sangre caliente, se descubren nuevos antibióticos como la terramicina y la neomicina, y se incorpora la vitamina B_{12} al arsenal vitamínico, y ea histamina y los esteroides al psiquiátrico.

La investigación científica ha llegado así en el año crucial de 1946 a un espléndido desarrollo. El investigador ha escrito con su labor su propia filosofía. En su microscopio y su tubo de ensayo, en su espectrofotómetro y su hematocrito, en su laboratorio y su clínica, treinta siglos de evolución histórico-médica estrechan la mano a veinte ciencias aliadas, desde la Física a la Agricultura. La Medicina del porvenir, será cada vez más una ciencia en sus métodos—la investigación pura y aplicada—pero también un arte en su finalidad moral de servir a los hombres. El médico es cada día más, un investigador, aunque sea en su simple consultorio o entre sus libros en la universidad. Para algunos investigadores seguirá la Fama haciendo "sonar sus largas trompetas," pero nuestra admiración está dedicada sobre todo a los que trabajan y desaparecen "sin cantar, pero con música en el corazón." Con unos y otros—los capitanes generales de la Medicina y los soldados rasos de la cruzada blanca—el mundo marcha por la ciencia y la conciencia, hacia la salud y la felicidad

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Original Articles

Technical Problems in the Surgery of Chronic Duodenal Ulcer*

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WINNIPEG

CHRONIC duodenal ulcer is a disease of world wide distribution from which no age, no class and probably no race is immune Its predilection for men in the most productive years of their lives is the cause of considerable economic distress, and its penchant for such serious complications as acute perforation, hemorrhage, penetration and stenosis occasions much physical suffering and no little loss of life Apart from such catastrophes as acute perforation and massive hemorrhage, in the presence of which it is required urgently to save life, surgical intervention is indicated even more frequently when increasing pain, frequent relapse, mild and recurrent hemorrhage or evidence of obstruction demonstrates the occurrence of the more common and more insidious complications of penetration and stenosis The surgical objectives under these circumstances are cure of the ulcer and restoration of health They have to be achieved in the face of uncertain etiologic factors and with the knowledge that after the operation the patient returns almost invariably to the circumstances of life under which, originally, the ulcer was acquired

Perhaps the most outstanding fact in regard to peptic ulceration is that it occurs not only in the stomach but even more commonly in the duodenum and other regions of the alimentary tract, such as the esophagus and the jejunum, that lie or are brought within the range of influence of the acid gastric juice Although this has focused attention on the role of acid in the pathogenesis and pathologic course of ulcer, most investigators today are little beyond the belief that an excessive flow of acid, continuing beyond the needs of digestion, is the most important single factor in determining the onset and progress of chronic ulceration It is still not known what initiates the breach of the mucosal surface out of which the chronic ulcer is developed, or what brings about failure of the ebb of the gastric acid tide Over the years, however, it has become evident that the most satisfactory and lasting results of surgical treatment are to be obtained by a type of operation that not only lowers the acid level but abolishes the continuous flow

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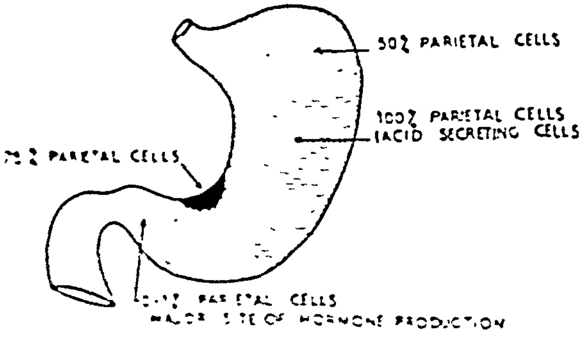
*[illegible] Special (May) Issue [illegible] Assembly of the [illegible]al College of Sur[illegible] 1949

Of all the various surgical procedures that have been advocated and tried from time to time, there are only two that may be said to satisfy these requirements, and they are partial gastrectomy and vagectomy. Though neither operation gives perfect results in all cases, partial gastrectomy has the sanction of experience and is favored by the majority of surgeons interested in this subject. It has been developed to such a degree as to be safe, and, provided that adequate amounts of stomach are removed, the results, both immediate and lasting, are very good. Earlier objections and a natural reluctance to remove a large amount of stomach for a disease which anatomically (though not embryologically) lies outside the organ have been overcome by the knowledge that life afterward is not only tolerable but even enjoyable for the large majority of patients. Gastrectomy for gastric ulcer is often considered to give better results, so far as subsequent anastomotic ulceration is concerned, than resection for duodenal ulcer. Is not this possibly due to the fact that for gastric ulcer resection is necessarily high and carries the ulcer with it, whereas for duodenal ulcer not only is the level of resection sometimes lower than it ought to be but the ulcer often is not removed? As Ogilvie, speaking of duodenal ulcer, puts it: "Gastric resection may mean anything from pyloric circumcision to a planned and effective removal."

Vagectomy is of much more recent origin and, in the very large majority of duodenal ulcers for which surgical treatment is indicated, has to be combined with gastroenterostomy. It is unlikely that this combined procedure will prove appreciably safer than partial gastrectomy; and although the immediate results are good so far as the abolition of pain and of night secretion of acid are concerned, there is reason to doubt their permanence in many cases. The operation is based on the premise that overactive vagal impulses are responsible for the abnormal behavior of acid, and, although this may be true, there is physiologic and clinical evidence to show that the stomach regains, in a relatively short time, the secretomotor power previously abolished by the vagal section. The immediate and striking removal of pain brought about by the operation, which is such a blessing and such a powerful mental stimulant to the patient, should not blind one to the fact that the ulcer is still present and that until it has healed the patient continues to be liable to the acute and dangerous complications of hemorrhage and acute perforation. Such accidents have indeed already occurred and are being reported with increasing frequency in the literature. Chiefly for these reasons I consider the operation one that needs considerable further evaluation and have hesitated to adopt it in preference to the older procedure of gastrectomy, with the results of which I have generally been well satisfied. Its chief value may lie in certain selected cases as an adjuvant to gastrectomy in young patients, and in certain other cases in which gastrojejunal ulceration and/or hemorrhage have followed subtotal gastrectomy or gastrojejunostomy.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[illegible] Fig. [illegible] Best [illegible] J. [illegible]

Reference to the distribution of the parietal cells of the gastric mucosa (Fig. 1) shows that a considerable number are congregated in the fundic mucosa—the portion left behind even in very high resection—and it becomes evident that the most a gastric resection achieves, so far as acid secretion is concerned, is a *reduction* in its level. It is not to be supposed, however, that the gastric stump is incapable on occasion of attaining fairly high levels of acid secretion. On what, then, do the generally satisfactory and lasting results of this operation depend? I believe the answer to this question is to be sought in the possible reasons for the continuous nature of the secretion. It is known that the physiologic mechanism of gastric secretion occurs in response to two kinds of stimuli, nervous and hormonal. Nervous stimuli are cerebral in origin, they arise in response to the sight, smell, taste or thought of food and are transmitted by the vagi As Pavlov showed in 1910, they are abolished by vagal section Hormonal stimuli are developed in the mucous membrane of the pyloric antrum, in that of the duodenum, and to some extent in that of the jejunum, in response to the early products of gastric digestion, especially protein The modus operandi of this double mechanism is obvious The neurogenic impulse stimulates hunger, prepares the stomach for the receipt of food and initiates the gastric digestive process The hormonal impulse, brought into being by the early products of digestion, ensures a continuous flow of acid gastric juice as long as there is food in the stomach Which of these is the more important in bringing about the continuous, excessive flow seen in patients with ulcer remains to be decided Belief in the importance of neurogenic impulses has been stimulated by the relatively common occurrence of peptic ulceration in persons of the tense, nervous type Such ulceration, however, is not restricted to this type, and the theory does not adequately explain the excessive flow of acid during the hours of sleep

No one will deny the importance of the neurogenic factor, especially as a predisposing cause of ulceration, but certain other factors in connection with the ulcer itself are also worthy of consideration It has been observed that in certain difficult cases, when the Finsterer exclusion type of operation has been done *and the hormone bearing mucosa of the pyloric antrum and the ulcer have been left behind,* the incidence of anastomotic ulceration has been high and associated with quite high levels of acid in the remaining gastric stump In a personal experience, some eleven years ago, with three such operations in which anastomotic ulceration had developed, the original duodenal ulcer was seen still to be active As removal of the pyloric antrum, including the duodenal ulcer, was followed in each case by relief of pain, reduction of the gastric acid levels and in time, evidence of healing of the anastomotic ulcer, the thought was entertained that the duodenal ulcer and its continued activity might be responsible in some way for the abnormal acid behavior It is a characteristic of mucosal tissue to excrete excessively in the presence of an irritant, such as an ulcer (e g , increased secretion in the mouth in the presence of a simple or malignant ulcer and in the stomach and rectum under similar circumstances) Dragstedt and Vaughan (1924) observed that an increased secretion of acid gastric juice followed the production of gastric ulcers in dogs by a technic involving irritation by silver nitrate injected beneath the mucosa and by a series of silk ligatures Harper (1932) produced ulcers in a series of intestinal loops connected to isolated gastric pouches and noted a rise of acidity and a prolongation of secretion in the gastric pouches *after* but not before the ulcers developed He noted also that the acid level remained constantly elevated even in the absence of food Cheney (1938) produced ulcers in chicks and reported an increased gastric acidity thereafter Wolf and Wolff (1944), in experiments on a human subject, observed the effects of gastric mucus in protecting the underlying mucosa If this protection were removed, not only did the acid peptic juice attack and erode the mucous membrane but, once this had occurred, a vicious circle was set up, contact of acid gastric juice with the eroded area induced acceleration of acid secretion Schiffrin and Ivy (1942), in accordance with the observation that hypersecretion of acid in patients with ulcer is not abolished by the use of atropine, commented that the increased secretion might be due to excessive liberation of histamine by irritated mucosa While it would thus seem reasonable to suppose that failure of an erosion to be sealed efficiently by mucus may call forth a continuous flow of acid peptic juice whereby it is converted eventually into a chronic ulcer and a vicious circle established, it is not possible at present to state whether this is mediated by way of the blood stream (humeral or hormonal) or by way of the vagi as part of a reflex arc The sites at which peptic ulcers commonly occur, viz , the lesser curvature of the stomach, the posterior wall of the duodenum and along the line of a gastrojejunal or gastroduodenal anastomosis, are just those regions where the mucosa is less redundant than elsewhere in the foregut, and an erosion in this area not only is less easily sealed by mucus but also is more readily exposed to irritation by food as well as by acid

SURGICAL MANAGEMENT

Having regard to these various possibilities, I have long considered a high partial gastroduodenectomy (Fig. 2) the procedure of choice in the elective management of chronic complicated duodenal ulcer. In my opinion the objects of the operation should be: (1) to divide the duodenum below the ulcer and thus to resect the ulcer, and (2) to resect the stomach proximally at a constant high level and thus to remove the bulk of the acid-secreting cells and the hormone-bearing area.

1. *Division of the Duodenum Below the Ulcer* (partial duodenectomy, *Figs. 3, 4, 5 and 6.*) This can be done with complete safety and is possible in all but the rare case in which the ulcer lies well down in the second part of the duodenum. In a long series in which resection at a level below the ulcer has been practiced, there has been no injury to the common bile duct and no instance of leakage from the duodenal stump. It is my conviction that the duodenal wall is the best tissue with which to close the duodenum, and the only way in which a sufficient amount of it can be made available for suture and easy inversion, in the large majority of cases in which the ulcer is situated in the first part of the duodenum, is by its mobilization below the ulcer. Any method in which resection is effected at or above the ulcer and which relies for closure of the duodenum on such available tissue as the side of the pancreas, or the omentum, is likely to give rise to trouble sooner or later. It is to be noted, and advantage taken thereof, that the reactive inflammatory process which leads to so much distortion, shortening and anchorage of the duodenum is congregated around that portion of it in which the ulcer is situated. Eighty per cent of the ulcers seen at operation lie on the posterior wall of the first part of the duodenum, and the pancreas, as well as the tissues overlying the adjacent common duct, shares in the reactive fibrotic process to an extent that seemingly protects the lumen of the duct from involvement in all but the very exceptional case. In cases in which the inflammatory process around the ulcer has been so marked as to form an appreciable mass (the so-called ulcer tumor) no special difficulty need be anticipated in resecting the ulcer. It has been my experience that a plane of separation through which the edges of the ulcer may be approached is always available in this type of condition, no less than in others of relatively less formidable appearance. It is sometimes of advantage to divide the duodenum at the level of the ulcer in order to expose its lowermost edge and then to complete the final stages of the dissection under vision. The knife is the best instrument with which to effect the dissection about the duodenum necessary to its exposure and isolation down to and just below the level of the ulcer, and it is used almost exclusively. It is desirable to avoid the use of

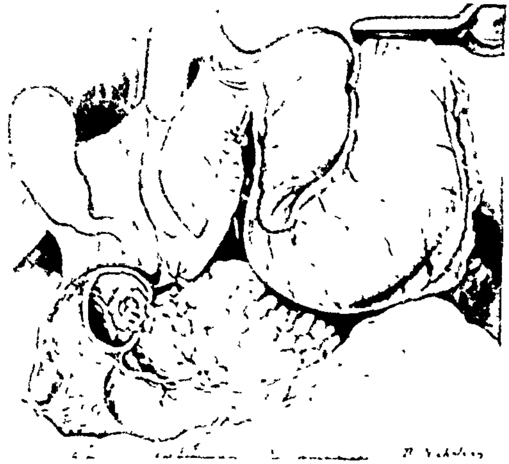
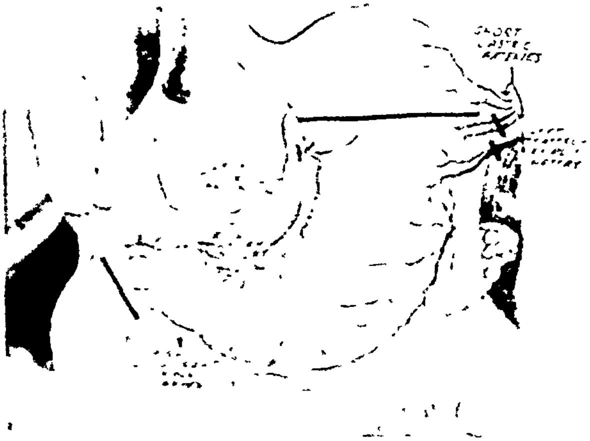


Fig. 3.—Duodenum divided at level of ulcer; stomach turned over to left. Sketch shows common situation of ulcer calling for surgical intervention. Inflammatory reaction and fibrosis of surrounding tissues not shown.



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crushing clamps on the duodenal wall, for they lessen the amount of tissue available for suture and easy inversion When inversion has been completed, the thickened serosal tissues previously dissected off the duodenum in the approach to it are sutured together so as to exclude the stump from the general peritoneal cavity

Although resection of the first part of the duodenum has been advocated not only as the procedure of choice but as a practical possibility in the management of complicated ulcers lying within it it is necessary to emphasize that it is a specialized surgical procedure and not ordinarily, within the competence of the casual gastrectomist Assistants possessed of the innate gentleness and manual dexterity essential to their development as surgeons master it without much difficulty and soon become quite competent Without special opportunities for training, however, it is better not to attempt one stage resection of many penetrating ulcers

In such circumstances the operation may be done in *two stages* At the first stage a Finsterer exclusion type high partial gastrectomy may be done the stomach being divided distally through the pyloric antrum about 2½ inches (6 5 cm) proximal to the pylorus About four weeks later the abdomen is reopened and the pyloric antrum, together with the ulcer, is removed Usually the ulcer will present a much less formidable appearance and its removal may be effected without any great difficulty Another alternative, in case of relative inexperience or especial difficulty, is to modify the Finsterer exclusion operation after the manner of Bancroft and to dissect out the pyloric antral mucosa down to and through the pylorus in order to remove a major source of hormonal influence A serious objection to this operation is a risk of leakage from the pyloric stump One reason for this is the impossibility of inverting the stump and of securing serosal apposition It has to be sealed very thoroughly with omental tissue Another reason for leakage is possible increased intraluminal tension if there is much spasm or organic obstruction around the pylorus or the ulcer In all cases in which this particular operation is done precautionary drainage is probably advisable

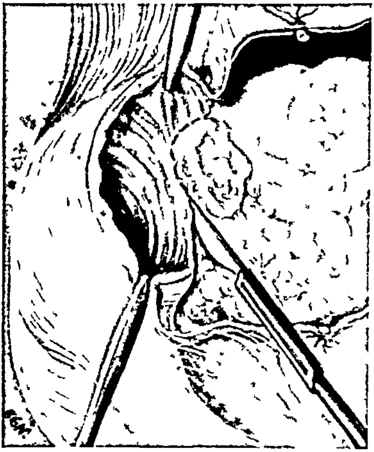

Fig 4—Duodenum transected at level of ulcer Knife is directed from below to plane of separation between duodenum and pancreas in approach to ulcer Dotted line shows direction of approach to complete separation of duodenum from ulcer When ulcer is densely adherent to pancreas, its base is removed together with duodenum When it is deeply penetrating, its base is left undisturbed on pancreas

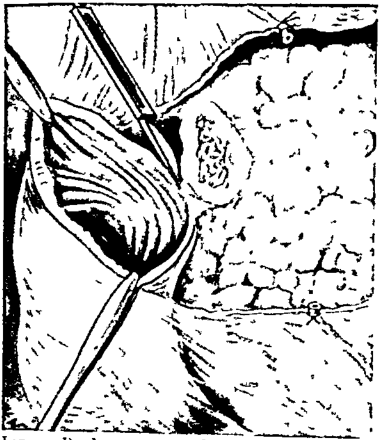

Fig 5—Duodenum transected at level of ulcer Knife is directed from above to [illegible] f separation [illegible] en duodenum and pan[illegible] [illegible] roach t

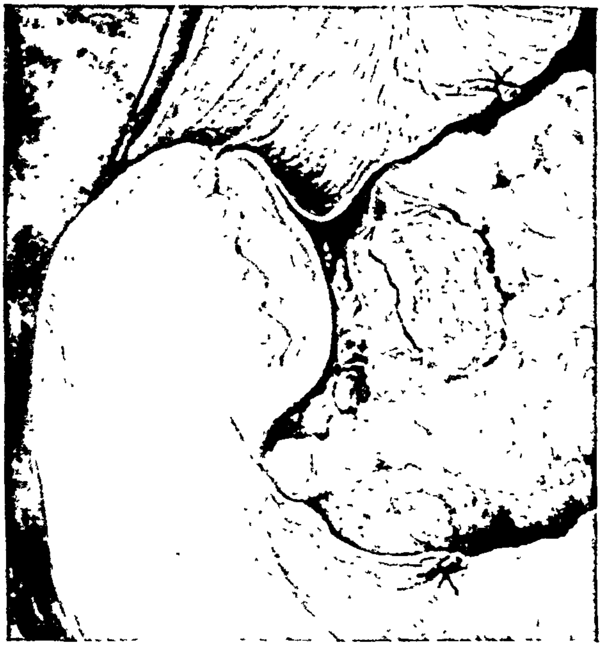

Fig. 6.—Closure of duodenum, effected in three layers with continuous No. 000 chromic catgut. Note that separation from the duodenum is slightly exaggerated. In practice, duodenal stump is excluded from general peritoneal cavity by suturing over it thickened serosa separated from its anterior wall to that overlying the pancreas.

2. *Resection of the Stomach at a Constant High Level.*—The purpose of this is to insure an adequate resection, not less than 75 per cent in all cases, and to standardize the amount left behind. It is, in reality, the satisfactory function and behavior of the remaining portion of stomach that determines the result of the operation, and, although records of the amount of stomach removed are necessary, their value is incomplete unless they are coupled with some definition of the amount left behind. It is my practice to section the lesser curvature just below the esophageal opening and the greater curvature at the second lowest of the short gastric arteries. With resection at this level, the "factory" in which most of the acid is produced is removed, as well as the hormone-bearing area and the ulcer, which may in some way stimulate its production. At the same time a standard amount of stomach is left behind, which, as I know from experience, will function very satisfactorily.

The jejunum is anastomosed to the stomach [illegible] *front of the transverse colon* in an isoperistaltic manner with the proximal loop brought up to the lesser curvature, and the sectioned stomach is closed partly from the lesser curvature to provide a stoma 2½ inches (6.5 cm.) in length at the greater curvature. The length of proximal jejunal loop from duodenojejunal flexure to lesser curvature measures from 15 to 18 cm. It is never necessary for the loop to be longer than this, for with resection at the level and in the manner described the stomach returns to its bed against the left dome of the diaphragm and carries the jejunal loops with it across the splenic flexure of the colon. Retrocolic anastomosis is used only in the exceptional instance, when there is some ptosis of the splenic flexure and the mesocolon is long. An *antecolic* anastomosis (Figs. 7 and 8) has been preferred since it was realized that the anastomosis could be effected little further down the jejunum than with a retrocolic anastomosis. It lies better, functions just as well and is easier to do.

OPERATIVE TECHNIC

The most satisfactory level of gastric section has yet perhaps to be decided, but the general rule at present is to remove not less than 75 per cent of the stomach. It should be emphasized that the younger the patient the more necessary it is to adhere to this rule. Provided an adequate amount of stomach is resected and the stoma is placed not too far down the jejunum, the incidence of anastomotic ulceration will be very low. Without denying the possibility of its occurrence, for where there is acid there is always some risk of further ulceration, I have yet to see it when the first part of the duodenum has been removed together with 75 per cent of the stomach. I have, on the other hand, seen many anastomotic ulcers develop when the resection has been performed at relatively low levels, and particularly has this been so in young patients.

In 1,116 resections for duodenal ulcer there have been 32 deaths. One of these deaths resulted from leakage of the duodenal stump in which closure was under slight tension as a result of inadequate mobilization of the duodenum, and the other from perforation of the stomach through an area of necrosis on the greater curvature just above the anastomosis. In the past ten years there have been 737 operations with 14 deaths, none of which was due to leakage, and the operative mortality rate is still falling Blood transfusion as a routine during and after the operation is unnecessary, it should be used, in my opinion, only when specifically indicated

POSTOPERATIVE MANAGEMENT

Postoperatively it is my practice to maintain continuous gastric suction for the first twenty-four hours and intermittent suction for forty-eight hours thereafter The suction is intermittent in the sense that the tube is clamped for half an hour after each drink Generally it is not removed until the passage of flatus per rectum indicates the return of adequate peristalsis The appended table shows the routine that is followed postoperatively with regard to fluids and food With this somewhat restricted routine no postoperative vomiting of any sort occurs in my own cases or those of my associates

Upon his discharge from the hospital the patient is advised to follow a somewhat restricted high protein—low fat diet for a month He is told to eat slowly and if bothered with a feeling of fullness or bile regurgitation (most likely to be encountered at breakfast in the first two or three months after operation) he is advised to restrict liquids with his meals and to drink mainly in between The "dumping" syndrome is occasionally troublesome in the first six months and appears to be due as much to rapid overloading of the stomach as to anything else It passes off in the course of time in the majority of patients, though in a few it persists as an occasional event over a number of years

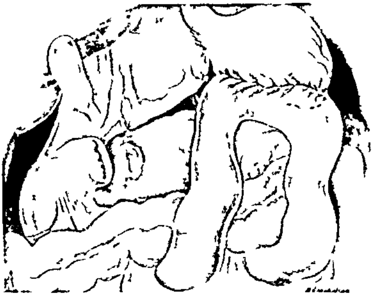

Fig 7—Antecolic isoperistaltic gastrojejunal anastomosis completed Stoma shown in sketch is smaller than in actual practice (2½ inches, or 6 2 cm, in length) Proximal jejunal loop, in practice, measures from 15 to 18 cm long and lies slightly more to left, over splenic flexure

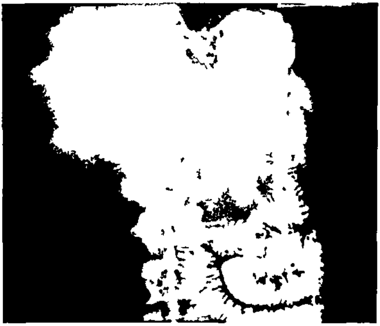

Fig 8—Roentgenogram taken six months after resection, showing size of gastric stump

After an initial cautionary period of dietetic care to allow for readjustment of the gastrointestinal tract, which varies from one to three months, dietary restrictions are removed and the patient is allowed to eat what he wishes I have found it useless as a rule to forbid the use of alcohol or tobacco for those patients who have the desire and the inclination The patient who is encouraged to return to his accustomed diet is more nearly a normal human being than if bound to a restrictive existence and, in my experience, is bothered less and less by memories of his departed stomach as the years go by

SUMMARY AND CONCLUSIONS

In conclusion, technical problems in the surgical handling of chronic duodenal ulcer are provided by uncertainties in regard to etiology, no less than by the complexities of the pathologic picture and the difficulties of resection In the main, the surgical objective has been a postoperative reduction in the levels of gastric acidity This has been achieved so far as gastrectomy is concerned, usually by removal of a suffici [illegible] amount of stomach to include the lesser [illegible] re the greater part o

Postoperative Diet

1st and 2d days:

On return from the operating room, to be given by mouth 3 oz. (85 Gm.) of hot dextrose water. Thereafter, throughout the day, two ounces every two hours. Clamp gastric suction for 30 minutes after each drink on the second day. Intravenously, 1,000 cc. of 5% dextrose-saline solution and 2 x 1,000 cc. of 10% dextrose in distilled water

3d day:

Albumin water sweetened with dextrose, 3 oz. (85 Gm.) every three hours by mouth. Clamp gastric suction for 30 minutes after each drink. Intravenously, 1,000 cc. 5% dextrose saline in the morning. 1,000 cc. 10% dextrose solution in the afternoon. 1,000 cc. 10% dextrose solution in the evening

4th day:

Albumin water sweetened with dextrose, 2 oz. (56.7 Gm.) every two hours. Intravenously, 1,000 cc. 10% dextrose solution in the morning and 1,000 cc. 10% dextrose solution in the afternoon

5th day:

Half-strength skimmed milk, 4 oz. (113.4 Gm.) every three hours (may be sweetened with dextrose). Intravenously, 1,000 cc. 10% dextrose solution morning and afternoon

6th day:

Normal strength skimmed milk, 4 oz. (113.4 Gm.) every four hours. Small amounts of strained orange juice. 1,000 cc. 10% dextrose solution intravenously

7th day:

Normal strength skimmed milk (flavored with tea or coffee if desired), 6 oz. (170 Gm.) every four hours. 1,000 cc. 10% dextrose solution intravenously. Egg flips (1 egg and ¾ pint (384 ml.) of milk divided into 3 parts) may be given on 2 or 3 occasions instead of the milk drinks

8th day:

6:00 a.m.—Milk, 6 oz. (170 Gm.)
8:00 a.m.—Milk, 6 oz. (170 Gm.), flavored with tea or coffee; 3 arrowroot cookies
12:00 noon—Egg flip, 6 oz. 2-3 oz. (56-85 Gm.) essence of chicken; 1 thin slice of bread and butter
4:00 p.m.—6 oz. (170 Gm.) milk, 3 arrowroot cookies
8:00 p.m.—Egg flip, 6 oz. (170 Gm.) junket and 1 thin slice of bread and butter
11:00 p.m. or midnight—milk, 6 oz. (170 Gm.)

9th & 10th days:

6:00 a.m.—Milk, 6 oz. (170 Gm.)
8:00 a.m.—1 soft boiled egg; 6 oz. (170 Gm.) milk, flavored with tea or coffee, one or two thin slices of bread and butter
12:00 noon—2 to 3 oz. (56-85 Gm.) essence of chicken; junket, 3 oz. (85 Gm.) milk, 6 oz. (170 Gm.)
4:00 p.m.—Milk, 8 oz. (226.8 Gm.) with two arrowroot cookies
8:00 p.m.—One soft boiled egg, milk, and 1 or 2 slices of bread and butter

11th day:

Convalescent Sippy diet

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the body, and the pyloric antrum. If one believes the ulcer itself to play some part in the abnormal flow of acid, its removal should form a part of the operation.

1. Surgical intervention is indicated in the management of chronic duodenal ulcer complicated by perforation, hemorrhage, penetration or stenosis.

2. The cause of this lesion is uncertain. Various effects connected with abnormal acid

secretion have been discussed Neurogenic influences are important predisposing factors They do not, however, account for all duodenal ulcers, and, so far as chronicity is concerned certain factors connected with the ulcer itself must be taken into account

3 High partial gastroduodenectomy is considered the operation of choice It is desirable to remove the duodenal ulcer as well as 75 per cent of the stomach By this means the "factory" in which most of the acid is produced is removed, together with such hormonal influences as may be concerned with abnormal acid flow

4 With adequate training and experience, resection of the ulcer is possible and safe except when it lies well down in the second part of the organ

5 Antecolic, isoperistaltic gastrojejunal anastomosis is preferred, with a stoma reduced to a length of 2½ inches (6 5 cm) It can be effected with a proximal loop 15 to 18 cm long at the level of the gastric resection described

6 Certain aspects of the immediate and postoperative management are discussed in this paper The aim is to avoid special dietetic care and to encourage the patient to lead a normal life

RÉSUMÉ

1 On indique le traitement chirurgical pour le traitement de l'ulcère duodénal chronique avec complication de perforation hémorragie, pénétration ou sténose

2 La cause de cette lésion est incertaine Diverses raisons que l'on rattache à une secrétion anormale d'acide ont été proposées Les facteurs neurogéniques peuvent y jouer un rôle important Ils ne sont pas la seule cause cependant de tous les ulcères duodénaux Certains facteurs apparentés à l'ulcère lui même sont significatifs quant à l'état chronique de cette lésion

3 La gastroduodénectomie partielle, haute, est la méthode de choix Il est recommandé de réséquer l'ulcère duodenal ainsi que 75% de l'estomac Ceci débarrasse l'organisme de "l'usine" qui produit la plus grande quantité d'acide et en même temps de certaines influences hormonales qui peuvent contribuer peut être à la production anormale d'acides

4 Si l'on a des connaissances et expériences suffisantes en cette spécialité on peut reséquer l'ulcère sans danger excepté lorsqu'il est situé dans la partie inférieure de la seconde moitié de l'organe

5 L'anastomose antécholique isopéristaltique gastrojéjunale est le procédé de choix à stoma de longueur réduite à 7 cms 5 Elle peut être effectuée avec une anse proximale de 15 à 18 cms de longueur au niveau de la resection gastrique décrite plus haut

6 Certains aspects du traitement immédiat et postopératoire sont enoncés Leur but est d'eviter les régimes spéciaux et d'encourager le malade à vivre normalement

RIASSUNTO

1 Un intervento operativo e' indicato nella cura delle ulceri duodenali croniche complicate da penetrazione o perforazione, emorragie, stenosi

2 La causa delle ulceri e' tuttora incerta Da una parte intervengono fattori vari collegati ad una secrezione acida anormale dall' altra sembrano intervenire—almeno quali fattori predisponenti—stimoli neurogenici patologici Quest'ultimi non sono pero' costanti Taluni altri fattori, connessi con l'ulcerazione stessa, assumono una certa importanza per quanto riguarda la cronicita'

3 L'operazione di elezione e' rappresentata dalla gastroduodenectomia parziale alta E' bene asportare le ulceri duodenali insieme al 75% dello stomaco Con cio' viene rimossa la massima parte della fonte di origine dell 'acido cloridrico, come pure la sede di influenze ormoniche che possono contribuire ad una secrezione acida anormale

4 Una larga esperienza ed una perfetta tecnica consentono la resezione dell'ulcera questa non e' possibile solo allorquando l'ulcera sia situata nella *porzione piu' bassa della seconda* parte del duodeno

5 E' preferibile un'anastomosi gastro digiunale antecolica ed isoperistaltica, con uno stoma non piu' largo di 7,5 cm Questa puo' essere effettuata con un'ansa prossimale lunga 15 18 cm a livello della resezione gastrica

6 Vengono infine discussi alcuni quesiti riguardanti le cure pre e postoperatorie, onde evitare speciali regimi dietetici e consentire ai pazienti una vita normale

RESUMEN

1. La intervención quirúrgica está indicada en el tratamiento de la úlcera duodenal crónica complicada por perforación, hemorragia, penetración o estenosis.

2. Las causas de esta lesión es dudosa, habiéndose supuesto que intervenían diversos efectos relacionados con uno secreción anormal del ácido gástrico. Los influencias neurogénicas son importantes factores predisponentes que, sin embargo, no permiten explicar todas las úlceras duodenales. Ciertos factores relacionados con la úlcera son significativos en lo que hace referencia a la cronicidad.

3. La operación de elección es la gastroduodenectomía alto parcial, siendo conveniente extirpar la úlcera duodenal, así como el 75 por ciento del estómago, lo que elimina la fábrica en la que se produce la mayor parte del ácido y también las influencias hormonales que pueden contribuir a la secreción ácida anormal.

4. Con adiestramiento y experiencia adecuados es posible la resección de la úlcera, especialmente cuando ésta está situada en la segunda parte del órgano.

5. Es preferible en la anastomosis antecólica, isoperistáltica gastroyeyunal, reduciéndose el estoma a una longitud de 7,5 cm., pudiéndose efectuar con una gaza próxima de 15 a 18 cm. a nivel de la resección gástrica descrita.

6. Se examinan ciertos aspectos del tratamiento inmediato postoperatorio cuyo propósito es evitar el cuidado dietético especial y alentar al paciente para que viva una vida normal.

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The Wisdom of Sir William Osler

Nothing in life is more wonderful than faith—the one great moving force which we can neither weigh in the balance nor test in the crucible.

Humanity has but three great enemies: fever, famine and war; of these by far the greatest, by far the most terrible, is fever.

This is yet the childhood of the world, and a supine credulity is still the most charming characteristic of man.

To have striven, to have made an effort, to have been true to certain ideals—this alone is worth the struggle.

I have three personal ideals. One, to do the day's work well and not to bother about tomorrow. . . . The second ideal has been to act the Golden Rule, as far as in me lay, toward my professional brethren and toward the patients committed to my care. And the third has been to cultivate such a measure of equanimity as would enable me to bear success with humility, the affection of my friends without pride, and to be ready when the day of sorrow and grief came to meet it with the courage befitting a man.

My Experience with Total Gastrectomy*

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THE MORTALITY of total gastrectomy was particularly high during the first years. Between 1913 and 1940, 29 patients died in 37 such operations, 79.2 per cent. From 1940 to the end of 1949 the mortality was somewhat decreased (103 patients with 51 fatalities, or 49.5 per cent). This is still much too high in comparison with the results achieved by other surgeons. The main reason for death was secondary infection of the wound (42 cases) either caused by draining of infectious material from the esophagus while the anastomosis was performed or due to leakage of the suture line. Diffuse peritonitis, which was fatal in 15 of my cases, was mainly due, during the first years, to the draining of infectious material through the esophagus and originating in the exulcerated carcinoma tissue. (Since I began performing the operation with the patient's pelvis elevated and applying suction either with Aubert's aspirator or with the Wangensteen tube, I have never lost a patient to diffuse peritonitis. I also drain the upper part of the abdomen in each case and segregate it from the free peritoneal cavity with gauze strips placed on the colon. This makes it possible to avoid, in almost every case, diffuse peritonitis due to leakage of the suture line.)

Suppuration was confined to the upper abdominal quadrants, and referred pleurisy on the left ensued in cases of esophageal fistula formation. Mediastinitis, which was the only fatal complication in 9 cases up to 1946, was also encountered with Lefèvre's method where there was no diffuse peritonitis, the one fatal complicating agent. The number of deaths due to septicemia or to referred pleurisy in cases of esophageal fistula has been considerably reduced in the past two years by regular use of the sulfonamides and penicillin. A protracted left subphrenic suppuration was present, whereas the esophageal fistula closed spontaneously if less than half of the ingested fluid drained through the fistula. Without drainage all those cured patients would have died of peritonitis.

Twelve such patients died of pneumonia. Most of these conditions in our Surgical Service are due to external adversities and are only incidentally connected with the operation. The patients died one to six weeks postoperatively. Among the 5 with gangrene of the lungs there was a 60-year-old man who died after six weeks. Postmortem examination revealed no complication in the abdomen and an ideally healed anastomosis. Six patients died one to four weeks postoperatively because of pulmonary embolism. Seven deaths were due to heart failure resulting from high grade arteriosclerosis. In a man 68 years old a coronary infarction associated with far-advanced syphilitic aortitis was observed at autopsy. A 60-year-old woman who died sixteen days after the operation had acute endocarditis of the mitral and aortic valves.

Rare complications involving death and discovered only at autopsy were fatal duodenal reflex, which has been mentioned; considerable anemia and cachexia (body weight 66 pounds), 1 case of fatal uremia, 1 of gangrenous colitis and 1 of volvulus of the jejunum.

The mortality rate of total gastrectomy was high even between 1940 and 1949, at any rate higher than Goto's figures reveal (21 operations with 8 fatalities, or 38 per cent). However, his patients were much younger; two-thirds were under 50 years of age, and the oldest was 61. At the Lahey Clinic (Boston) the mortality rate between 1927 and 1942 was 41.3 per cent; up to 1945 it decreased to 16.3 per cent (43 total gastrectomies with 7 fatalities). According to Smith, this was due to improvement in surgical technic and above all to a better selection of cases. Use of sulfonamide compounds and antibiotics, as well as improved preoperative and postoperative care, also contributed toward these results. Lefèvre of Bordeaux was able to achieve the best results with his method. Up to 1947 he had only 5 fatalities (15.6 per cent in 38 total gastrectomies). There was not a single case of leakage of the suture line.

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*Continued from Special (May) Issue.

Unfortunately I experienced failure with the Lefèvre method also; in 33 total gastrectomies I had 16 fatalities, which were partly due to leakage of the anastomosis caused by gangrene of the esophagus. Such failures are depressing. Possibly the technic of the anastomosis, which favors gangrene of the suture line, is at fault. I think that my mistake was to put the interrupted stitches of the anastomosis too near one another, which may have facilitated leakage of the suture line. This, however, does not explain gangrene of the posterior wall of the esophagus to the extent of 2 to 3 cm. in the oral region, which inaugurated mediastinitis. I have observed this twice lately at autopsies. This extensive necrosis is most probably due to emaciation. It was not a rare occurrence in patients who had lost 20 to 30 Kg. because of famine. I have never considered these patients' condition as contraindicating total gastrectomy.

Smith attributed the decreased mortality since 1942 to the better selection of patients for total gastrectomy. I never have declined to perform a radical gastrectomy on a patient (if the carcinoma was anatomically still operable) because of his advanced age or his poor general condition, as such a patient would be absolutely lost without operation, the omission of which is tantamount to a 100 per cent mortality. After the operation some of these patients may even be permanently cured. When I was a medical student I heard my teacher, Prof. Gussenbauer, who was a pupil and successor of Billroth, say repeatedly, "He who saves one out of ten patients who would be doomed without operation has achieved a great deed." I have followed this dictum in all my operations and I intend to continue, even though my mortality rate is higher than the mortality of surgeons who select their patients. Possibly better preoperative and postoperative care of patients in a poor general condition may lower the mortality figures. During my recent visit to the United States, I saw for myself how much better preoperative and postoperative care of the patient can be taken there. In Europe we lack the equipment and the patient would find the cost prohibitive.

For the past three years I have given all my patients a postoperative blood transfusion, which is repeated on the next day. This is combined with the use of circulatory stimulants. It would be of considerable advantage if all of these patients could have one or several preoperative blood transfusions also, to counteract their considerable anemia. Unfortunately this would involve too great expenditure, and in my opinion it is not absolutely necessary for patients who undergo subtotal gastrectomy in which the stump of the stomach, which is used for the anastomosis, is not only covered with serosa but is well supplied with blood. Sulfonamide and penicillin in postoperative care have been commonly used during the past three years. Sulfonamide is applied to the upper abdominal area (which has been previously packed with gauze strips) as well as dusted into the abdominal wall. The use of both drugs has enabled me to cope successfully with severe infections that were not due to leakage of the suture line. Further experience is needed for a verdict as to whether total gastrectomy carried out by the transthoracic approach will reduce fatalities due to leakage of the suture line and ensuing wound infection, and whether it will be possible to operate on unselected patients as I do in using the abdominal route. Transthoracic total gastrectomy makes it difficult to mobilize the stomach properly, to ligate the major gastric arteries and to resect the greater omentum. This endangers the thoroughness of the operation. For this reason Schönbauer has performed an abdominothoracic gastrectomy.

Laparotomy is first performed (with intratracheal anesthesia). The greater omentum is separated from the colon, and the stomach is completely mobilized. The duodenum is severed, and the stomach and the duodenum are closed by a row of stitches. The uppermost jejunal loop is pulled into the upper abdominal area through a slit in the mesocolon. Fifty cm. distally an enteroanastomosis is performed; then the laparotomy wound is closed and the patient rolled over to the right side. The thoracic cavity is opened in the eighth intercostal space, and the circular segment of the diaphragm around the esophagus is split.

The stomach and the first jejunal loop are then transferred into the thoracic cavity and a wide anastomosis between the esophagus and the jejunum is performed The stomach, with the diseased cardia and part of the esophagus is removed, and the opening in the diaphragm is sutured In lieu of the esophagus the jejunum is pulled through the diaphragmatic hiatus and fixed to the diaphragm

Schonbauer recorded 2 fatalities among 5 patients on whom operations were done by this method

A 68 year old man died on the seventeeth postoperative day because of strangulation ileus (his anastomosis was in perfect working order) and peripheral pulmonary embolism due to rheumatic endocarditis

A 71 year old woman died five days after the operation Autopsy revealed dilation of the duodenum and subileus in the area of the jejunoesophageal anastomosis, together with compression of the left lung by fluidothorax

As these 2 patients had no leakage of the anastomosis, all 5 may be said to have had a perfect suture line

The simultaneous and extensive opening of the abdomen and the thorax has the advantage of insuring a radical procedure and of obtaining a reliable anastomatic suture line This combined method may be carried out successfully in any institution where suitable apparatus and an anesthetist for intratracheal anesthesia are available Prolonged future experience will show whether extremely emaciated patients can tolerate simultaneous opening of the two cavities without damage

The general condition of those patients who were discharged from the hospital after successful total gastrectomy is of great importance In a lecture at the Vienna Medical Society in 1946 I reported that of 35 patients discharged as cured 8 were living abroad with no information available and 4 had died of intercurrent diseases within five years Two patients died within a year after operation 1 of pneumonia and 1 of thrombosis of the superior mesenteric vein No metastases were observed post mortem

A 71 year old man who underwent operation on May 1, 1942, died sixteen months later of progressive anemia and cachexia No metastases were observed at autopsy

A 54 year old man was subjected to operation on Dec 8, 1941, and was presented to the Medical Society as cured, required treatment for anemia in the fall of 1944 As a result of this treatment his weight increased Toward the end of 1944 he moved to a rural area and had no complaints of any kind According to his wife's statement, he died of pneumonia in November 1945

Fourteen patients died of recurrent carcinoma, 8 of whom had metastases to the liver with icterus, 4 had metastases to the retroperitoneal lymph nodes without signs of local recurrence (no dysphagia or stenotic symptoms) Two patients had dysphagia after an interval, of these, 1 died six months later in his native community, probably of recurrent carcinoma, though no autopsy was performed

The other of these 2 patients was a man aged 54 who underwent operation July 30, 1945, and was readmitted to the Surgical Service three and one half months later because of continual vomiting and further loss of weight (weight, 32 Kg, height, 162 cm) A gastrointestinal roentgen series disclosed stenosis of the esophagus with retention, which was amenable at least temporarily to atropine therapy, so that deglutition was possible again Ten days later the patient died Autopsy revealed high grade stenosis of the end to side anastomosis, which was patent only for the knob of a sound No carcinoma was observed on histologic examination, only scar formation being visible However, there was a hazelnut sized metastasis to the liver Death was caused by bilateral pneumonia and brown atrophy of the liver and the myocardium

Nine patients remained cured up to May 31, 1946 Seven of these were presented at a session of the Medical Society as cured on that date All 7 are living and free of recurrence at the time of writing (January 1950) One woman died after five and one half years and 1 man after seven years because of progressive anemia and cachexia but without signs of recurring carcinoma, they must therefore be listed among those permanently cured In view of the fact that reports of permanent cures are scarce, I should like to present the case histories of 9 patients

REPORT OF PERMANENT CURES

Case 1 —A 48 year old woman underwent operation on May 8, 1940 She had been ill only three months but had lost 5 Kg in weight There was a fist sized carcinoma of the pars cardiaca which extended up to the esophagus. I performed a total gastrectomy with an end-to-side anastomosis. The histologic diagnosis* was adenocarcinoma. In the esophagus no carcinomatous growth was demonstrable, and there was no involvement of the lymph glands. Twelve days after the operation a small fistula formed, through which but little food emptied. The fistula healed speedily, but the patient's recovery was slow. She gained 10 kg. in weight. She felt perfectly well for the next two years, after which an ascending invagination of the small bowel through the enteroanastomosis into the afferent loop required another operation. This was performed by Prof. Kunz. Later (*Zentralbl. f. Chir.* No. 22, 1943) she was presented to the Surgical Assembly as cured. After the fall of 1945 the patient lost 12 Kg. and suffered from severe anemia and hunger edema. In January 1946, therefore, she was admitted to the Medical Policlinic (Prof. Fellinger), where she was treated with blood transfusions and injections of liver. She was discharged after a considerable gain of weight, with the anemia improved (4,000,000 erythrocytes per cubic millimeter of blood; Sahli 78). A repeat red cell count in the same clinic in December 1949 revealed 3,200,000 cells per cubic millimeter of blood, Sahli 63, color index 0.99. As of January 1950 this patient was normally active and performing household duties, but looked pale.

CASE 2.—A woman aged 63, on whom operation was performed Oct. 25, 1940, had been ill four months previously and had lost 15 Kg. in weight. Gastric analysis revealed the hydrochloric acid secretion rate to be 0/15. The erythrocyte count was 4,000,000 per cubic millimeter of blood; Sahli, 41; color index 0.5. A gastrointestinal roentgen series showed a mass on the lesser curvature in the pars cardiaca. On laparotomy a fist-sized carcinoma of the lesser curvature was demonstrated, which extended upward to a point 1 fingerbreadth off the esophagus. No glands were involved. During subtotal resection it was discovered that the carcinoma involved the cardia on the posterior aspect, and total gastrectomy was performed instead. Histologic examination revealed adenocarcinoma infiltrating all layers of the gastric walls and extending upward to the esophagus but 1 cm. short of the resection line. No lymph nodes were involved. Healing took place without fistula formation. Recovery was slow. Up to 1944 the patient felt fairly well, but after January 1945 there was progressive anemia; dysphagia was not present, but there were loose bowels. According to a report given by her relatives, the patient died of anemia in November 1945.

CASE 3.—A woman aged 65 underwent operation on Jan. 20, 1941, after an illness of two years' duration in which she had lost 66 pounds (29.9 Kg.). Roentgen examination showed an extensive neoplasm extending from the pylorus up to and over the middle of the stomach. Operation revealed multiple masses in the pars media, and a large mass which looked like carcinoma was situated on the greater curvature in the fundus. First I tried to perform subtotal gastrectomy, but total gastrectomy was necessary because there was tumor tissue in the resection line. The histologic diagnosis was lymphosarcoma of the stomach. The neoplastic tissue extended right up to the pylorus and just below the pavement epithelium of the esophagus. All lymph nodes were affected. Healing took place without fistula formation. The patient increased in weight from 32 to 46 Kg. Postoperatively she was treated with roentgen irradiation. Up to June 1945 she felt perfectly well, but at that time she was hospitalized for six weeks because of dysentery, and her weight went down to 32 Kg. On March 4, 1946, she was admitted to the Medical Policlinic (Prof. Fellinger) because of anemia and hunger edema. After adequate treatment, her erythrocyte count increased from 2,600,000 to 3,500,000 per cubic millimeter of blood, Sahli 66. Since then she has felt well. She was presented to the Medical Society as cured on May 31, 1946. Another erythrocyte count, made on March 26, 1949, at Prof. Fellinger's clinic, revealed 3,060,000 cells per cubic millimeter of blood, Sahli 57, color index 1.1. In January 1950 the patient, now 74 years old, presented herself again. She is comparatively active and has no complaints.

CASE 4.—A woman aged 50 underwent operation on May 29, 1941, after ten years of treatment for pernicious anemia. She had been fairly well until one year prior to operation, but from that time had complained of anorexia, vomiting of the coffee-ground type and loss of weight (10 Kg.). Operation revealed a larger than fist-sized mass on the lesser curvature projecting into the stomach and extending up to the esophagus. The tributary lymph glands were swollen. Total gastrectomy was performed. Histologic examination revealed an adenomatous papillary polyp with malignant degeneration at its base. No involved glands were demonstrable. There was no fistula formation, but left-sided pleurisy was present. Up to the summer of 1945 the patient felt well. At that time she was under medical care in Bavaria for rather severe anemia. Her condition improved, and she was presented to the Medical Society as cured on May 31, 1946. An erythrocyte count taken at Prof. Fellinger's clinic amounted to 2,880,000 per cubic millimeter of blood; Sahli 60, color index 1.05. She has felt well ever since. She was last seen in D[illegible]ber 1949, at which time she was with[illegible] though rather pale.

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*All histologic examinations were performed at the Vienna Pathological Institute (Prof. Chiari, Director).

CASE 5.—A man aged 64 underwent op[illegible] on June 27, 1941, after an illness of [illegible] duration. He had had anorexia for six [illegible] and had lost 11 Kg in weight. Operation revealed a fist sized carcinoma of the lesser curvature extending almost to the cardia. Enlarged glands were observed around the celiac axis and [illegible] also removed. In the course of perf[illegible] gastrectomy it was observed that th[illegible] tended up to the cardia on the poste[illegible] made total gastrectomy mandatory. [illegible] amination revealed adenocarcinoma [illegible] liferated below the pavement epi[illegible] esophagus but was still 12 mm [illegible] line. No glands were involved. [illegible] esophageal fistula formed but [illegible] patient gained in weight fr[illegible] (16 Kg). Until the autumn [illegible] then he began losing weight [illegible] tremely ill. He was admitte[illegible] clinic in May 1946, with seve[illegible] the erythrocyte count was [illegible] millimeter of blood, Sahli 1[illegible] leukocytes numbered 2,300 [illegible] blood. The sedimentati[illegible] (W[illegible] method) was 164/170 mm [illegible] millimeters of mercury [illegible] diastolic. After two blood [illegible] each and after abundant [illegible] a slow recovery took pla[illegible] discharged (on July 20 [illegible] the eryt[illegible] count was 2,300,000 per [illegible]illimeter of blood, Sahli 50. There was a n[illegible] and the patient had gai[illegible] Kg, now weigh[illegible] 44 Kg. His appetite wa[illegible] and he [illegible] any kind of food. Early [illegible] 1948 he was admitted to a hospital for aged p[illegible]ns where he died on March 25 of anemia and [illegible]exia. As no clinical signs of recurrence had ever been present, no autopsy was done.

CASE 6.—A man aged [illegible] underwent operation on July 4, 1941. For the past fifteen years he had had "stomach trouble," and one year prior to operation he had had a gastric hemorrhage. A second hematemesis took place four months after the first, and one week prior to operation a third hemorrhage occurred. There had been no loss of weight and the patient's appetite was good. Gastric analysis showed a hydrochloric acid value of 0.10. Operation revealed a mass the size of a child's fist situated in the pars cardiaca and extending up to the esophagus. Enlarged glands of the celiac axis were removed. Total gastrectomy was performed. The histologic report was that of carcinoma granulomatosum infiltrating all layers of the gastric wall and extending up to the esophagus in the submucosal layer. Draining lymph glands also showed signs of malignant change. The wound healed without fistula formation and the patient gained 8 Kg in weight. He felt well until April 1945, then he lost 12 Kg, having no adequate food supply (he was a resident of the Wiener Neustadt area near Vienna). He was admitted to Prof. Fellinger's Clinic because of his poor condition. The erythrocyte count was 2,800,000 per cubic millimeter of blood, Sahli 65. After blood substitution therapy and systemic liver treatment the erythrocyte count rose to 3,500,000 and he showed a gain in weight. He then felt well for a time but had to be admitted twice to the same clinic because of exacerbations of his condition. In April 1949 the erythrocyte count was 2,000,000 per cubic millimeter of blood, Sahli 59. The color index varied accordingly. The patient presented himself again in December 1949, stating that he had some discomfort while working (he was a carpenter). On this date the erythrocyte count was 3,120,000, the value for hemoglobin was 62 per cent, the color index 1.

CASE 7.—A man aged 61 underwent operation on Jan. 5, 1942. He had had trouble with his stomach for twelve years, with repeated medical treatment. Two years prior to operation severe pains occurred and the patient lost 27 Kg in weight. A carcinoma the size of a child's fist was present on the posterior aspect of the pars cardiaca, extending into the esophagus. I performed gastrotomy to establish the diagnosis. I observed an ulcer which protruded into the stomach and which had a firm granular margin. My diagnosis was either exulcerated carcinoma or secondary malignant change in a chronic peptic ulcer. I performed total gastrectomy. Histologic examination revealed the latter, with carcinoma formation in one of the lymph glands of the lesser omentum. No other glands were involved. There was healing without fistula formation, but a long drawn out suppuration of the abdominal wall ensued. The patient gained 5 Kg. He was able to eat any kind of food but was always hungry. After April 1945 he lost considerably in weight and was progressively anemic. He was admitted to the Medical Polyclinic of Prof. Fellinger in the autumn of 1945. The erythrocyte count was 2,500,000 per cubic millimeter of blood, Sahli 60. Treatment was of no avail. He was readmitted to the hospital, and remained there from Jan. 9 to March 16, 1946. An improvement was obtained in the erythrocyte count, which advanced to 3,400,000, Sahli 67. On May 11 he was presented to the Medical Society as cured. His condition depended largely on the changing food situation. In January 1949 he was readmitted in

Fellinger's Clinic for recurrent anemia. Systemic liver therapy changed his preadmission erythrocyte count of 2,200,000, Sahli 40 to 3,220,000, Sahli 71. In January 1950 the count was 3,600,000, Sahli 70, color index 0.9.

CASE 8.—A 37-year-old woman who underwent operation on Dec. 30, 1942, had complained of gastric trouble for four years. In the six months prior to operation she had lost 8 Kg. Operation revealed a fist-sized carcinoma of the lesser curvature of the pars cardiaca, extending up to the esophagus. There also was a carcinoma of the greater curvature in the pars media, the size of a dove's egg. Total gastrectomy was performed. Histologic study revealed the mass on the lesser curvature to be an infiltrative granulomatous carcinoma which had deeply extended into the adjacent fat tissue. The polyp-like tumor on the greater curvature was a carcinoma solidum. Only 1 to 7 extirpated glands of the greater omentum showed carcinoma formation. There was healing without fistula formation. The patient lost 22 Kg. (a decrease from 71 to 49 Kg.) because she never had enough to eat. In January 1946 there was dysphagia. Roentgen examination showed a narrowing of the esophagus at the diaphragmatic level. The patient was admitted to Fellinger's Clinic for internal therapy. After prolonged treatment the dysphagia completely receded, and no stenosis was demonstrable on roentgen examination. The patient was presented to the Medical Society as cured on May 31, 1946. In October, progressive anemia and poor general health called for another admission to Prof. Fellinger's Clinic. After blood transfusions and liver and iron therapy, she was discharged with an erythrocyte count of 2,700,000 per cubic millimeter of blood, Sahli 54. She felt better, gained in weight and was able to perform her duties as a housewife. In December 1949 she came to my Outpatient Department, but only because of an injury to her left hand. At the time of writing she looks well and is able to perform her household duties.

CASE 9.—A 53-year-old woman underwent operation on March 11, 1944. She had been ill for four months and had lost 17 Kg. She weighed 45 Kg. and had severe anemia; the erythrocyte count was 2,100,000 per cubic millimeter of blood, Sahli 35. She had a carcinoma of the pars media which extended up to the esophagus. I performed total gastrectomy. Histologic examination revealed an adenocarcinoma, partially papillary, pervading all layers of the gastric wall. One lymph gland in the greater omentum was also carcinomatous. The patient had intercurrent pneumonia. Three weeks after the operation an esophageal fistula formed, which close spontaneously after a few days. Recovery was slow. After the summer of 1945 there was considerable loss in weight, due to lack of food. In the fall of that year the patient was admitted to the Medical Policlinic (Prof. Fellinger) because of anemia (erythrocyte count 2,500,000), edema and heavy blood diarrhea. Two months later she was discharged with an erythrocyte count of 3,490,000, Sahli 66, color index 0.9. She was in better general condition. She gained in weight and felt well up to the beginning of 1946, when she began to deteriorate. On March 18 of that year she was readmitted to Fellinger's Clinic. The blood count showed 2,600,000 erythrocytes and 4,000 leukocytes per cubic millimeter, Sahli 45, color index 1.3. There was slight improvement after hydrochloric acid and iron substitution therapy, but the diarrhea vanished. On May 31 the patient was presented at the Medical Assembly. Her condition thereafter changed according to the food situation. A recheck erythrocyte count on Jan. 17, 1948, at Fellinger's Clinic, revealed 2,680,000 red blood cells per cubic millimeter, Sahli 88, color index 1. I saw the patient several times, the last time in December 1949. She looked well and was able to pursue her normal activities.

Up to 1940 I had achieved no permanent cures after total gastrectomy. The improvement since that time is attributable mainly to earlier operation. Histologic examination in 4 cases revealed the resected lymph glands to be free of carcinoma, and in 3 other cases only 1 lymph gland was affected. In Case 3 all lymph glands examined were invaded, but this was a case of lymphosarcoma. In Case 6 no detailed report is available as to whether all or only a few of the lymph glands were affected with carcinoma. The permanent cure in Case 8 is of particular interest, as Prof. Chiari diagnosed two distinct carcinomas: one situated in the cardia, which was granulomatous and had extended deeply into the adjacent omental structures, the other polypous and of the "carcinoma solidum" type. Only 1 of 7 lymph glands of the greater omentum examined histologically showed carcinoma.

Even more interesting was the case of a 66-year-old patient on whom I performed total gastrectomy on Oct. 7, 1947. The resected stomach showed three different masses. The histologic report of Prof. Chiari described a flat mass adjacent to the cardia, measuring 6.35 cm., diffusely infiltrating all layers of the stomach and firmly exulcerated. This was a scirrhous carcinoma. Another mass in the middle of the lesser curvature, papillary and 2 [illegible] cm thick, had infiltrated the wall of the stomach and proved to be a papillary polyp undergoing malignant degeneration In the same stomach was a cuplike exulcerated mass located just ahead of the pylorus and [illegible] ing from the greater curvature It measured 6 cm in diameter and 2 cm in thickness and had caused considerable stenosis of the pyloric mouth This was a poorly differentiated [illegible] carcinoma The patient a business man [illegible] ing well and is able to walk [illegible] November 1944 at which time [illegible] condition

Fifty two total gastrect[illegible] formed between Jan 15 1940 [illegible] April [illegible] 1944, 24 patients died and [illegible] as cured Of the latter [illegible] recurrence for five to nine [illegible] and may therefore be [illegible] cured. This small group [illegible] tation in percentage ba[illegible] permanent cures woul[illegible] cent of all patients ope[illegible] cent of those discharge[illegible] yield even a higher p[illegible] cures than that achie[illegible] trectomy In a contr[illegible] 260 primary carcin[illegible] 1933 showed 29 6 per [illegible] In 99 cases of second[illegible] ulcer there were onl[illegible] nent cures according [illegible]

Surgeons have lon[illegible] perience with ear[illegible] the prognosis of [illegible] is better if the reg[illegible] affected. This [illegible] and total gastrec[illegible] reexamined [illegible] radical gastr[illegible] for carcin[illegible] 1936 and Dec 31 [illegible] patients who [illegible] tomy [illegible] ment of the [illegible] nation [illegible] recurrence [illegible] patients [illegible] veloped [illegible] were free [illegible] Those who [illegible]

volvement showed different figures Of 101 patients with primary carcinoma only 16, or 15 9 per cent and of 25 with peptic ulcer carcinoma 3 or 12 per cent were permanently cured This also applies to total gastrectomy Of 12 cured operative patients who had no lymph gland involvement, 5 were permanently cured ([illegible]8 3 per cent) Of 16 patients whose [illegible] lymph glands were affected with carcinoma 2 only remained permanently cured (12 5 per cent)

Permanent cures due to total gastrectomy are [illegible] in the literature, as most reports [illegible] only to the immediate results [illegible] (Tokyo, Japan) reviewing the literature in [illegible] was able to find only 1 case (Moynihan [illegible] Wrede) in which the patient lived more [illegible] three years Of his own patients dis[illegible] as cured 10 died during the first year and 3 during the second year, only 1 was alive at the time of his publication, one year and eight months after the operation In [illegible] Clinic according to Smith, 43 of 62 [illegible] discharged as cured had died by the [illegible] of reexamination and only 3 were permanently cured [illegible] losses in weight up to 20 Kg. Severe anemia and hunger edema were also frequent, especially among persons of low income, who had to subsist on legal rations, having no money to procure extra food at the black market. These patients were admitted to Fellinger's Clinic, where their erythrocyte counts were improved with systemic liver and iron therapy and with repeated small blood transfusions, whereupon their discomfort receded. Thus, Fellinger has considerably contributed to the increase in the number of my permanent cures. On behalf of the permanently cured I wish to express my gratitude to him, as I have done before. It is my firm belief that the fatalities in Cases 2 and 5 could have been avoided had the patients been treated for their anemia in time. The patient in Case 5 had already had one successful treatment for his anemia.

Fellinger in 1946, after my conference at the Medical Assembly, pointed out that after total gastrectomy the first loops of the small bowel assume the function of the stomach. Digestion in the small bowel develops without major interference if external conditions are normal. Fellinger reported at the Austro-Swiss Medical Meeting in Bâle on Oct. 18, 1949, on anemia after gastrectomy, speaking of blood counts he had performed on 8 patients who had undergone total gastrectomy. He included my 7 patients who after total gastrectomy had been permanently cured. The important fact was established that pernicious anemia developed in all patients within three to five years. Its occurrence, however, coincided with and was probably dependent on the particularly poor nutritional situation of 1945 and 1946.

The following final conclusions were drawn: In patients subjected to total gastrectomy, true pernicious anemia developed in the poverty-stricken years 1945 and 1946. Its morphologic nature and the crisis in the reticulocyte count, according to Castle, were established. This type of anemia developed even with mild liver therapy and reacted very slowly to parenteral liver therapy, which was frequently administered to patients with pernicious anemia at the time. Only after the loose bowel movements had been brought under control and after substantial meat feedings did sudden and considerable improvement become noticeable. These facts cannot be due exclusively to the bare external lack of the extrinsic factor. Its supply improved otherwise normal persons with pernicious anemia but not persons who had undergone total gastrectomy. One must presume that there was a combination of scarce external supply and poor absorption and utilization of the extrinsic factor, with a consequent decrease in production of the intrinsic factor. Only after the considerable dyspepsia had been corrected was any real improvement achieved. Even this did not suffice completely in times of want. Response to liver therapy was definite but slow. Now the response to liver is good, even if the patient's condition is exacerbated as a result of missing liver injections for some time. Undoubtedly the lack of many potent protein substances and their derivatives plays an important role, as was apparent at the time of poor supply. The good reaction to folic acid is to be viewed on the same basis.

It was extremely important that patients who had received successful and prolonged treatment of their anemia and hunger edema at Fellinger's Clinic received, at regular intervals, CARE food parcels through the Mennonite World Aid Committee. They were thus able to maintain their general condition to some extent. I have expressed more than once my heartfelt thanks to the Mennonite World Aid Committee for their invaluable help. The comparatively high number of permanent cures during those adverse years was possible only through their efficient contributions and those of Dr. Fellinger.

Total gastrectomy is a complicated operation even for a surgeon who is familiar with gastrointestinal surgery. Even today it has quite a mortality rate. After completion of a successful operation, the patient, in order to live, requires rich and substantial food to maintain his weight and his normal working capacity. If his food supply is inadequate, severe anemia will develop within three to five years at best. This anemia is amenable to sound therapy in the hands of competent and experienced internists.

Because of its high mortality and because of the danger of postoperative pernicious anemia, total gastrectomy is indicated only for carcinoma. For high-lying peptic ulcer near the cardia it is never warranted since the patient can be safely operated on and permanently cured by the Kelling Madlener technic or by the curved resection method

SUMMARY

A series of 140 total gastrectomies is reported The operations were performed between 1913 and 1949 at Hochenegg's Clinic in several private hospitals and since 1935 at the Surgical Service of the Vienna Allgemeines Krankenhaus under the diagnosis of carcinoma In 4 cases the operative diagnosis of carcinoma was not substantiated by histologic examination Two patients had polyps of the stomach 1 had gastric syphilis and 1 had a peptic ulcer of the greater curvature extending into the spleen and to the pancreas With the diagnosis of peptic ulcer total gastrectomy was never performed even for ulcers near the cardia In 535 cases of ulcer in the vicinity of the cardia curved resection with anastomosis of the Billroth I or the Hofmeister Finsterer variety was performed and in 79 cases the Kelling Madlener technic was used (resection of one half to two-thirds of the distal part of the stomach the ulcer remaining in situ in the cardial gastric stump)

Total gastrectomy was always performed by the abdominal route with local anesthesia of the abdominal wall and spinal anesthesia This type of anesthesia enabled me to operate even on old and emaciated patients (of 140 patients 59 were 61 to 75 years of age)

Operative Technic —I employed end to side anastomosis with the first jejunal loop and enteroanastomosis or Y shaped anastomosis and in some cases anastomosis according to Lefevre

Mortality —Between 1931 and 1940 the mortality rate was 79 2 per cent (37 patients, 29 fatalities) Between 1940 and 1949 it was 49 5 per cent (103 patients 51 fatalities)

Fatalities were due to secondary infection of the wound (42 patients) peritonitis mediastinitis and septicemia with or without leakage of the suture line Twelve were due to pneumonia 5 to gangrene of the lung and 6 to pulmonary embolism Heart failure with coronary infarction arteriosclerosis and endocarditis occurred in 7 cases One fatality each was due to duodenal reflex, anemia and cachexia gangrenous colitis and volvulus.

Improvements in operative results should be achieved not by selection of cases but through better preoperative and postoperative treatment (blood transfusions etc)

Permanent Results —Nine patients operated on between 1940 and 1944 were permanently cured Seven patients were still living in January 1950 a 48 year-old woman (operation May 8 1940) adenocarcinoma no lymph gland involvement, a 65 year-old woman (operation Jan 20 1941) lymphosarcoma all lymph nodes affected a 50 year-old woman (operation May 29 1941) adenomatous polyp with secondary malignancy no lymph gland involvement, a 47 year-old man (operation July 4 1941) carcinoma granulomatosum and carcinomatous lymph nodes, a 61 year-old man (operation Jan 5, 1942), carcinoma formation in a peptic ulcer 1 lymph gland affected with carcinoma, a 37 year-old woman (operation Dec 30 1942) 2 separate carcinomas, a carcinoma granulomatosum infiltrans and a carcinoma solidum 1 lymph node of the greater omentum showed carcinomatous change, a 53 year-old woman (operation March 11 1944) papillary adenocarcinoma carcinoma tissue in 1 lymph gland

Two patients died without recurrence a 63 year-old woman (operation Oct 25 1940), adenocarcinoma, lymph glands free, died November 1945 of pernicious anemia, a 66 year old man (operation June 27, 1941) adenocarcinoma, lymph glands free died March 25 1946 of anemia and cachexia

Between Jan 1 1940 and April 1 1944 52 total gastrectomies were carried out with 28 cures Nine of the patients are permanently cured which is 17 3 per cent of the total or 32 1 per cent of those discharged as cured When subtotal gastrectomy was performed for carcinoma 29 6 per cent of permanent cures of primary carcinoma was recorded in 1938, and 24 2 per cent in cases of secondary malignancy of peptic ulcer

In all patients who were permanently cured Fellinger detected, three to five years after the operation and coinciding with the lamentable food situation of 1945 and 1946 the appearance of pernicious anemia due to a combination of inadequate supply and poor resorption and utilization of the extrinsic factor, with deficient production of the intrinsic factor. The patients were treated successfully only after their dyspepsia had been controlled.

Because of its high operative mortality and the danger of postoperative pernicious anemia, total gastrectomy is indicated only after the diagnosis of carcinoma has been established beyond doubt. It should never be used even for highly located peptic ulcers of the cardia, once they are recognized as peptic ulcers. These ulcers can be operated on without dangerous risk and permanently cured by curved resection or by the technic of Kelling-Madlener.

RÉSUMÉ

Dans les cas de carcinome il est toujours possible d'assurer la restauration d'une évacuation normale. Toutefois, il faut éviter une colostomie permanente. S'il n'est pas possible après la résection du colon descendant d'anastomoser le moignon intestinal, une anse de l'iléon, exclu, peut être interposée entre la portion proximale du colon et le rectum. Cette opération est rarement pratiquée; d'après mon expérience personnelle, portant sur plus de 450 résections radicales pour carcinome du colon, elle ne fut indiquée seulement que dans 5 cas. Les 5 malades furent guéris. Trois de ces guérisons peuvent être considérées comme définitives: celle d'une femme de 65 ans, opérée il y a dix ans; celle d'un vieillard de 71 ans, opéré il y a dix ans et demi, et celle d'un vieillard de 73 ans, opéré il y a 5 ans. Ces malades sont toujours vivants et bien portants, et ils ont des selles normales et spontanées. De plus, l'interposition de l'intestin grêle fut employée pour assurer la restauration de la continuité de l'intestin, dans 2 autres cas; l'un pour lequel une résection gastrojéjunale et des résections du colon en deux temps furent faites en raison d'une fistule gastrocolique; l'autre, pour lequel on pratiqua ces opérations pour une déchirure du colon sigmoïde et descendant associée à une rupture de la rate à la suite d'un avortement instrumental. On sauva les deux malades.

Dans les cas de carcinome du rectum j'ai pu conserver le sphincter dans 70.4% de ces 603 interventions radicales. Les résultats définitifs de l'opération conservant le sphincter furent meilleurs que ceux obtenus après l'ablation de ce sphincter. 33.3% des malades qui subirent la résection sacrée, et 46.4% de ceux qui subirent la résection abdomino-sacrée sont restés à l'abri de rechute depuis plus de cinq pour certains jusqu'à vingt-deux ans pour d'autres. Le pourcentage de guérisons après cinq ans pour la résection du sacrum fut de 21.4%, et pour la résection abdomino-sacrée de 37.5%. Parmi les malades, chez lesquels le sphincter avait été conservé, 94.8% furent continents, même à l'issue des matières et des gaz après fermeture de la transversostomie. La formation d'une fistule après la résection peut être évitée, soit par la résection abdominale (l'anastomose étant faite dans le pelvis lui-) même), ou par la méthode préconisée par Bacon.

En présence d'une nécrose considérable d'une portion du colon proximal et d'un sigmoïde d'une longueur insuffisante, une anse iléale peut être interposée entre le colon descendant et le moignon rectal. Pour restaurer la continuité intestinale j'ai fait cette opération dans 42 cas avec un cas de mort du à des sutures insuffisantes.

Dans les cas de carcinomes situés près du sphincter, une colostomie abdominale sous cutanée peut être faite, dans laquelle la partie de l'intestin qui se trouve entre la peau et la gaine rectale peut être comprimée par une ceinture de sorte que le malade peut retenir temporairement le contenu intestinal et même les gaz. Comme cela ne constitue pas un remplacement parfait du sphincter, le chirurgien fera bien de conserver ce sphincter, s'il est possible, dans l'intérêt supérieur du malade.

RESUMEN

En cases de carcinoma siempre es posible restaurar la evacuación normal, debiendo, por lo tante, evitarse una colostomía permanente. Si es imposible, después de practicar la resección del colon descendente, anastomosar los extremos intestinales, puede interponerse el asa excluída del ileo entre la porción proximal del colon y el recto. Esta operación raramente se practica. En la experiencia del autor con más de 450 resecciones radicales para tratar un carcinoma del colon, dicha intervención estuvo indicada solamente en cinco casos, curándose

todos ellos Tres de las curaciones pueden considerarse como permanentes la de una mujer de 65 años operada hacía diez años, la de un hombre de 71 años operado hacia diez años y medio, y la de de un hombre de 73 años operado hacia 5 años Todos estos pacientes han sobrevivido y estan en la actualidad bien de salud y evacuan normal y espontaneamente También se empleo la interposición del intestino delgado en otros dos cases, uno para restaurar la continuidad del intestino grueso En uno de ellos se practicó una resección gastroyeyunal y resecciones colómicas, y dos fué para tratar una fistula gastrocolica y en otro paciente se practicaron ambas operaciones por existir una laceracion del colon sigmoideo y colon descendente asociado a una ruptura esplénica, resultante de un aborto instrumental Ambos pacientes han continuado en buen estado

En los casos de carcinoma rectal ha sido posible al autor preservar al esfinter en un 70 4 por ciento de 603 operaciones radicales Los resultados permanentes de la operacion con preservacion del esfinter fueron mejores que los obtenides a continuacion de la extirpacion del mismo El 33 1/3 por ciento de los pacientes sometides a reseccion sacra y 46,4 por ciento de los que sufrieron una reseccion abdomino sacra quedaron libres de recaidas durante 5 a 22 años El porcentaje de curacion al cabo de 5 años de una extirpacion sacra fue de 21,4 por ciento, y despues de una extirpacion abdominosacra de 37,5 por ciento De los pacientes en los que se preservo el esfinter, el 94,8 por ciento permanecieron con una continencia esfintérica incluso para las deposiciones sueltas y para el flato, despues del cierre de la transversostomia Puede evitarse la formacion de fistulas despues de la reseccion, bien sea practicando una reseccion abdominal, realizando una anastomosis en la verdadera pelvis, o por el metodo introducido por Bacon

Cuando existe una necrosis considerable de la parte del colon proximal y el colon sigmoideo que no es suficientemente largo, puede interponerse un asa del ileo entre el colon descendente y el muñón rectal para restaurar la continuidad Esta operacion se practico por el autor en cuatro casos resultando una muerte por insuficiencia en la linea de sutura

En casos de carcinoma cerca del esfinter puede practicarse una colostomia abdominal subcutanea en la que puede comprimirse aquella parte del intestino que yace entre la piel y la vaina del recto mediante un cinto para que el paciente pueda retener temporalmente el contenido del intestino e incluso el flato Por no existir un sustituto completamente satisfactorio para el esfinter el cirujano debe conservarlo, si ello fuera posible para beneficio del paciente

RIASSUNTO

Una normale evacuazione puo' essere sempre ripristinata nei cancri dell'intestino bisogna quindi evitare una colostomia permanente Se un'anastomosi dei capi intestinali dopo resezione del colon discendente non e possibile, si puo' effettuare l'esclusione e la successiva interposizione di un'ansa dell'ileo fra la porzione prossimale del colon ed il retto Un'operazione del genere viene eseguita di rado l'A l'ha eseguita 5 volte sopra un totale di piu' di 450 resezioni radicali per carcinoma del colon I 5 pazienti sono tutti guariti In 3 casi la guarigione puo' essere considerata definitiva, e cioe' una donna di 65 anni operata 10 anni or sono un uomo di 71 anni operato 10 anni 1½ or sono un uomo di 73 anni operato 5 anni fa I pazienti sono tutti vivi, in buone condizione di salute la defecazione e le feci normali In due altri casi l'interposizione dell'intestino tenue e' stata eseguita allo scopo di ristabilire la continuita' dell'intestino Nel primo caso si trattava di una resezione gastro digiunale, seguita da una resezione in due tappe del colon per fistola gastro colica nel secondo caso si trattava invece di una lacerazione del sigma e del colon discendente, con rottura della milza, in seguito ad un aborto strumentale Anche in questi due casi la guarigione e' riuscita perfetta

Sopra un totale di 603 operazioni radicali per carcinoma del retto, l'A ha potuto risparmiare lo sfintere nel 70,4% dei casi I risultati a distanza in questo gruppo di casi sono apparsi notevolmente migliori di fronte a quell privati dello sfintere 33 3% dei pazienti sottoposti a resezione sacrale e 46,4% dei pazienti sottoposti a resezione addomino sacrale sono rimasti immuni da recidive per un intervallo oscillante da 5 a 22 anni la percentuale di guarigione dopo 5 anni e' risultata del 21,4%

nel primo gruppo di casi, del 37,5% nel secondo. Per quanto riguarda la funzione dello sfintere, questa e' risultata normale nel 94,8% dei casi nei quali era stato conservato. La formazione di fistole dopo la resezione puo' essere evitata sia mediante resezione addominale (l'anastomosi viene eseguita nella pelvi vera), oppure col metodo proposto da Bacon.

Qualora esista una notevole necrosi della porzione prossimale del colon ed un sigma *troppo* corto, si puo' interporre un'ansa intestinale fra il colon discendente ed il moncone rettale. L'A. ha eseguito quest'operazione in 4 casi, con un esito letale per insufficienza della linea di sutura

Nei carcinomi prossimi allo sfintere, si puo' *eseguire una colostomia sottocutanea addominale*: la porzione dell'intestino che giace fra la cute e la fascia del retto puo' essere compressa da una cintura, di modo che i pazienti possono ritenere—almeno temporaneamente—le feci ed anche i gas.

Dato che non esiste ancora una sostituzione ideale per lo sfintere, e' bene che il chirurgo faccia tutto il possibile per conservarlo.

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Experimental Induction of Acute Gastric Ulcers with Histamine in Beeswax*

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OF ALL the theories that have been advanced concerning the etiology of gastric ulcer, the acidopeptic theory probably has the most subscribers. This theory is primarily based on studies of the induction of gastric and duodenal ulcers in animals. The main principle of these experi[illegible] the induction of a disturbance [illegible] alkaline balance, either by diminu[illegible] alkaline component or by raising [illegible] tent of the gastric juice.

The former object [illegible] attain [illegible] surgical procedures [illegible] the alkaline bile and th[illegible] The best known of these [illegible] surgical duodenal drainage [illegible] amson, in which the duoden[illegible] diverted to a terminal ileac lo[illegible] Williamson performed this expe[illegible] in 14 of which they produ[illegible] acute or chronic ulcers in th[illegible] nstrable on gastroenterostom[illegible] variations of the Mann-Williamson [illegible] have been performed, with similar results (Owings and Smith, 1932; McCann, 1929; Jenkins and Palmer, 1931, and others). Other surgical procedures, such as the creation of external biliary and pancreatic fistula (Ellman and Hartman, 1931; Berg and Zucker, 1932; Bickel, 1909; de Bakey, 1937), implantation of the bile duct into the terminal portion of the ileum (Neumann, Dernoor and Deloyers, 1931; Loewy, Berg and Jobling, 1930), and cholecystnephrostomy (Kapsinow, 1926), have the same effect in principle, namely, deficiency or failure of neutralization of the gastrointestinal juice and the consequent development of ulcers.

The other way to bring about a disturbance of the acidalkaline balance is to induce a rise in the acid content of the gastric juice. This can be effected by injection of certain chemical substances that stimulate the stomach to hypersecretion. A general effect on the experimental animal is brought about by intravenous or intramuscular injections, or a local effect by an injection directly into the gastric wall. A large number of agents have been tried, several of which have yielded positive results; e.g., pilocarpine (Underhill and Freiheit, 1928; Light, Bishop and Kendall, 1932); cinchophen (Van Wagoner and Churchill, 1932; Stalker, Bollman and Mann, 1936), and caffeine (Hanke, 1934; Roth and Ivy, 1945; Merendino, 1945). Among substances that produce these effects, i.e., hypersecretion, increased acidity and ulcers, histamine occupies a unique position; it has a very strong hypersecretory action. Its effect on gastric secretion has long been known. A number of experiments designed to produce ulcers have been performed with histamine in water solution (McIlroy, 1928; Buchner and Malloy, 1927; Burkle de la Camp, 1929; Matsuda, 1931; Heinlein and Kastrup, 1938), with varying results. Some authors have reported positive results, others negative. Orndorff, Bergh and Ivy (1935) conducted an investigation on dogs. Ten animals received subcutaneous injections of 2 mg. of histamine in water solution every two hours ten times a day. During the remaining four hours of each day the animals were allowed to eat. The experiments continued for sixty-six days. In 4 of the animals superficial erosions were observed in the duodenum; in the others there was no effect whatever. No demonstrable ulcer was observed in any case.

The reason for the poor or absent effect lies in rapid absorption of the water solution, on account of which the hypersecretory effect of the histamine rapidly disappears. Histamine in water solution, therefore, is scarcely suitable as a means of inducing ulcers. The methods described by Code and Varco (1940) of using beeswax as a medium for histamine administration represents an important advance, as it allows the histamine to be freed

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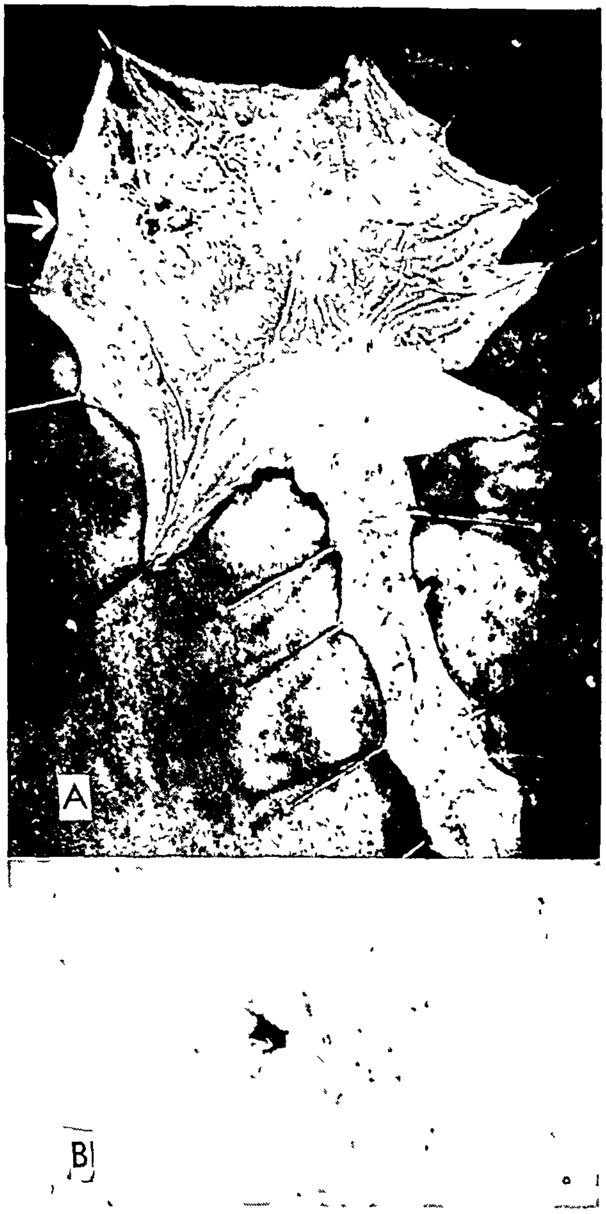

Fig. 1 *(Experiment 36; histamine dose, 10 mg.; guinea pig killed twenty-four hours after injection).—A*, 2 deep ulcers located contiguously in the fundus, 1 of them on the point of perforating. *B*, same ulcers as in Figure 3, at higher magnification.

gradually and thus produces a prolonged effect. In preparing the mixture the histamine, completely separated from water, is mixed with warm liquid beeswax; when cooled, the mixture assumes an ointment-like consistency. This substance is injected intramuscularly into the experimental animal. The histamine is gradually liberated from the beeswax and during this process produces a maximal secretion of strongly acid gastric juice. The effect of an injection may last twenty-four hours or more. Because of this gradual liberation it is possible to inject very large doses of histamine, many times in excess of the lethal dose of histamine in water solution.

By daily injections for varying periods, Code and Varco and others were able with great regularity to produce ulcers and even perforations in the stomachs and duodenums of various species of experimental animals. The chronic ulcers produced in this way were similar in many respects to those occurring in man. The method seems to offer the most satisfactory way of studying problems related to ulcers, their prevention and treatment. With the help of this method, American investigators, notably Wangensteen, and others have made important experimental studies on technical problems associated with the surgical treatment of ulcers.

The method has been published. It has been employed mainly for a study of chronic effects of histamine and the induction of chronic ulcers. Since liberation and absorption of the beeswax-histamine compound commence immediately after injection, the effect of the histamine is promptly noted. Only a few minutes after the injection the effect is seen both on the circulatory and respiratory organs and on the gastrointestinal canal. Intestinal peristalsis is accentuated concurrently with an excessive hypersecretion of strongly acid gastric juice. This rapid effect makes it possible to study even those early changes in the mucous coat which characterize the initial stages of ulcer development. The aim of the present investigation is, therefore, to study the development of ulcers in the acute stage, with special reference to (1) the rapidity of development of ulcers; (2) the ability of varying doses of histamine to produce ulcers, and (3) the macroscopic and microscopic pictures of fresh ulcers.

TECHNIC

In preparation of the beeswax-histamine mixture and in experimental procedure I have followed, in the main, the principles set forth by Code and Varco. Guinea pigs, which have been found especially suitable for this method, were used. Hay, Code, Varco and Wangensteen tried the method on several different species of animals, including cats, dogs, rats, guinea pigs, pigs, etc., finding the highest incidence of ulcers in guinea pigs and dogs Of 8 guinea pigs treated with histamine, they found chronic ulcers in 6; of 12 dogs, ulcers occurred in 11. The lowest incidence of ulcers was found in rabbits. The number of injections in their investigations ranged between 4 and 37 in dogs, between 2 and 11 in guinea pigs, and between 5 and 41 in rabbits

In the present investigation *only one injection* was given in each case. The animals received no food for twenty-four hours prior to the beginning of the experiment. The injection of beeswax-histamine was made intramuscularly in the haunch Within a few minutes the effect of the histamine began to appear in the form of general uneasiness, mucous discharge from the nostrils, excretion of urine and feces, and dyspnea In certain cases spasm also occurred, this condition invariably constituting a threat that usually led to death. Worthy of note is the relation between the animals' size and their tolerance of histamine; it was not unusual to find that a small animal reacted less strongly and survived more readily than did a large one, with identical doses of histamine.

Effect of a Beeswax-Histamine Injection After Twenty-Four Hours

The present investigation comprised 49 surviving animals, the weight of which ranged between 500 and 700 Gm. Each animal received a single intramuscular injection of beeswax-histamine. Doses varying between 0.1 and 10 mg. were tried. The animals were killed by a heavy blow on the head twenty-four hours after the injection, obduction and removal of the stomachs and duodenums being carried out with great care to obviate traumatic changes. After dissection of the stomachs and duodenums along the grater curvature, the preparations were stretched out on cork discs and carefully washed clean with physiologic solution of sodium chloride.

The experimental series comprised eight groups given doses of histamine ranging from

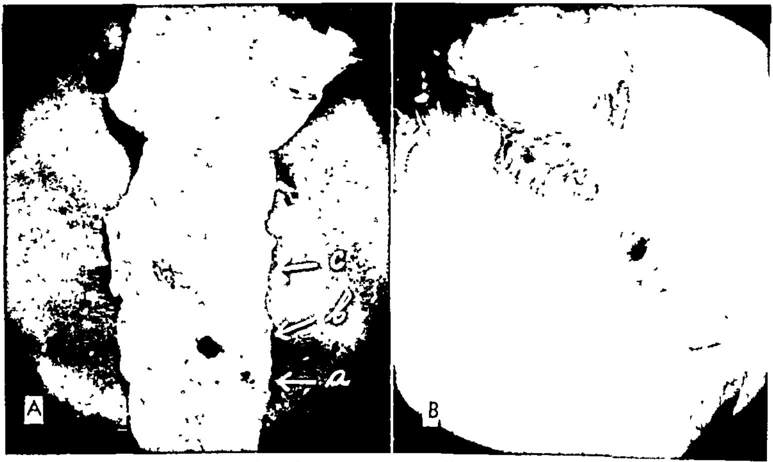

Fig 2 (*Experiment 83; histamine dose, 5 mg.; guinea pig killed twenty-four hours after injection*).—*A*, 3 duodenal ulcers in various stages: (*a*) fresh bleeding, (*b*) perforation and (*c*) deep ulcer. *B*, (same preparation as in Figure 5.) The perforation in the duodenum is seen from the outside.

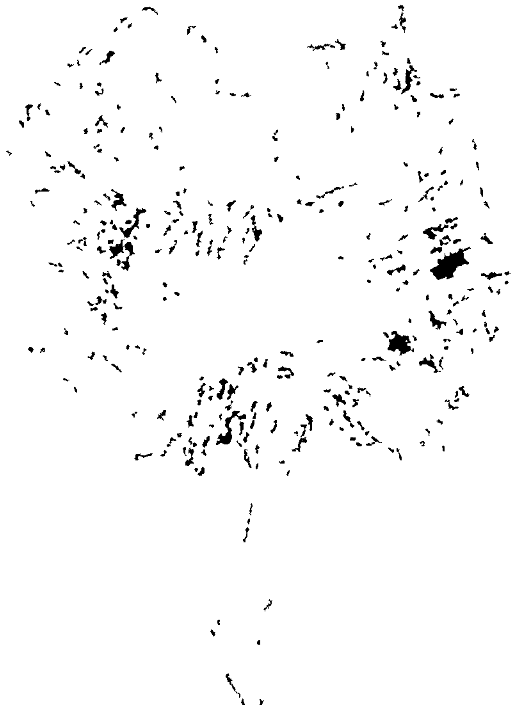

Fig. 3 (*Experiment 303; histamine dose, 10 mg.; guinea pig killed half an hour after injection*).—Extensive hemorrhages in the gastric mucous membrane. No pathologic changes are observed in the duodenum.

0.1 to 10 mg The results are listed in Table 1.

The number of experimental animals in the various groups varied between 2 and 19. The largest group, comprising 19 animals, received a dose of 5 mg. Of these 19 animals, ulcers were produced in 16, or 84 per cent. No fewer than 9 of these 16 presented perforating ulcers, 8 duodenal and 1 gastric. Duodenal ulcers occurred in 13 and gastric ulcers in 3.

The 10 mg. dose was given to 8 animals. Ulcers were observed in all of them, including perforating ulcers in 3, in each case localized in the duodenum.

A 7.5 mg. dose was administered to 2 animals. Both showed perforating ulcers in the duodenum, and 1 a deep ulcer in the stomach as well.

Three animals were given a dose of 2.5 mg. In 2 of them perforations arose in the duodenum, the third animal presenting a deep ulcer in the stomach.

Doses of 1 and 0.5 mg. were administered to 4 and 3 animals respectively. Each of these animals presented ulcers but no perforation. Two groups, each of 5 animals, received doses of 0.2 and 0.1 mg. respectively. In 1 of them a slight mucosal hemorrhage occurred in the duodenum; otherwise there were no macroscopic changes in either.

It is apparent from these results that the entire ulcerous process, from the start to full perforation of the wall, may be completed in a very short time, at all events in the course of twenty-four hours. Worthy of note is the large number of perforations that occur. Of these 31 animals that received doses ranging between 2.5 and 10 mg., perforating ulcers were found in no fewer than 15. In several other cases the ulcerations were very deep. Of the 37 which showed positive results, 17 presented multiple changes, while 20 had only single ulcers.

TABLE 1.—*Results of Intramuscular Injection of Histamine in Beeswax after Twenty-Four Hours*

Histamine dose, in mg.	No of animals	Positive results	Negative results	Changes in duodenum				Changes in stomach			
				Perforations	Deep ulcers	Superficial ulcers	Bleeding	Perforations	Deep ulcers	Superficial ulcers	Bleeding
10	8	8		3	6	4			2		
7.5	2	2		2	1				1		
5	19	16	3	8	6	2		1	2		
2.5	3	3		2	1	1			1		1
1	4	4			2	1	1			2	
0.5	3	3									
0.2	5	1	4				1				
0.1	5		5								

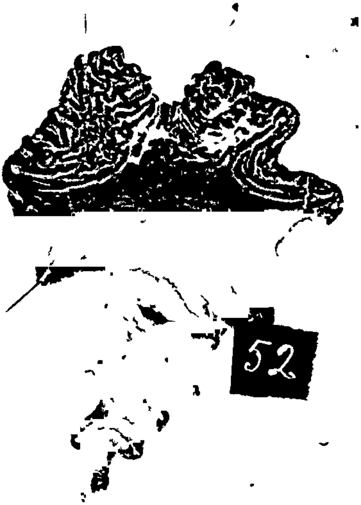

Fig 4 *(Experiment 52, histamine dose, 5 mg , guinea pig killed twenty four hours after injection)* —Sharply circumscribed perforating ulcer in the duodenum

There was a considerable preponderance of duodenal ulcers as compared with gastric ulcers, this ratio applying to all doses As regards localization, some of the duodenal ulcers were found proximal to the duodenal papilla, which in guinea pigs lies only a centimeter or so from the pylorus, some on, or contiguous to the papilla, and some distal to the papilla along a stretch of approximately 3 cm In most cases the duodenal ulcers were solitary but in some animals there occurred several small well circumscribed ulcers located in a row along the duodenum The gastric ulcers were chiefly localized in the region of the antrum though in exceptional cases ulcers occurred in the fundus No ulcers were observed at the cardiac orifice or in the esophagus

As regards the macroscopic appearance of the acute ulcers two different types were observed in the duodenum The first and commonest of these was characterized by its rounded form and sharply defined demarcation from the surrounding tissue (Figs 1, 2) It varied in size between a pinhead and a pea. In most of the animals it was a solitary ulcer, though 2 or more occurred in some cases When several were present, they were located in a longitudinal row in the intestine The other type of ulcer was characterized by its attenuated form It had the appearance of a long, narrow ulcerous furrow extending along the duodenum, usually in the scope of the lesser curvature

In depth these ulcers ranged from superficial to perforating The lesion in the earliest pre ulcerous stages seemed to consist of a small punctate hemorrhage in the mucous membrane The floor of the ulcer was usually covered with coagulated blood or a yellow grey membrane consisting of remnants of necrotic mucosa The deep ulcers which extended through the muscle layers to the serous coat but had not yet perforated had the appearance of a dark patch when seen from the outside (Figure 2B) On one occasion I was able to observe how the perforation itself took place through the serous coat

The rounded, well circumscribed ulcer pre

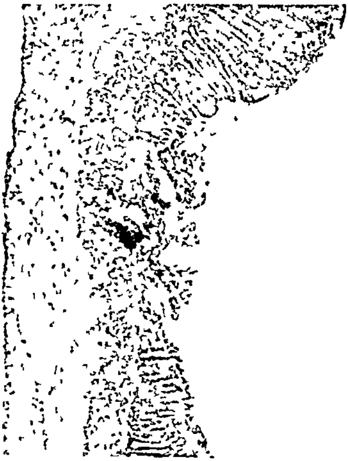

Fig 5 *(Experiment 10C, histamine dose, 1mg , guinea pig killed twenty four hours after injection)*—Duodenal ulcer involving the mucous and submucous coats

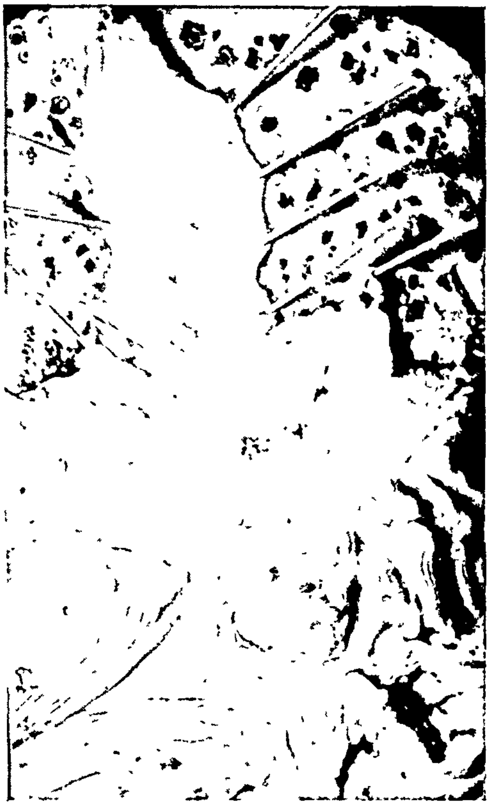

Fig. 6 (*Experiment 76; histamine dose, 5 mg.; guinea pig killed three hours after injection*).—Three superficial gastric ulcers located above the pylorus.

viously described occurred in the stomach (Fig. 1), being localized as a rule to the vicinity of the antrum. In certain cases the shape of this ulcer diverged from the usual rounded form and was more in the nature of a fissure. Moreover, in the stomach a few relatively large or small, irregularly shaped blue-black patches were observed. These consisted of superficial ulcerations in which bleeding was conspicuous. These changes were observed especially in the fundus, where in some instances they covered rather large areas (Fig. 3).

Macroscopic examination of the preparations indicated that the pathologic change in the wall, namely the ulcer, was a sharply circumscribed process locally. Even though the form and size varied, the boundary between the lesion and the surrounding tissue was quite distinct. Apart from the circumscribed ulcerous areas, the mucous membrane appeared macroscopically normal.

The locally circumscribed nature of the ulcerous process also appeared distinctly on microscopic examination of histologic preparations. Both in early superficial ulcers and in deep or perforating ulcers the mucous membrane showed an apparently normal structure contiguous to the ulcer itself, with its broken-down layers in the walls (Figs. 1, 4, 5, 6 and 7). The floor of the ulcer was lined with broken-down fragments of mucous membrane and elements of blood. In the early superficial ulcers the process was wholly confined to the mucous membrane. In certain cases there occurred an edematous loosening-up in the layers of the wall outside. As the process continued toward the deeper layers, a moderately pronounced round cell infiltration occurred in the surrounding tissue. No vessels showing thrombotic changes were observed in the vicinity of the ulcers.

Short-Term Effect of Histamine Injection

Worthy of note is the rapidity with which the ulcerous process develops. The cases described here show that the development of an ulcer, and indeed perforation, may take place in the course of twenty-four hours. It is

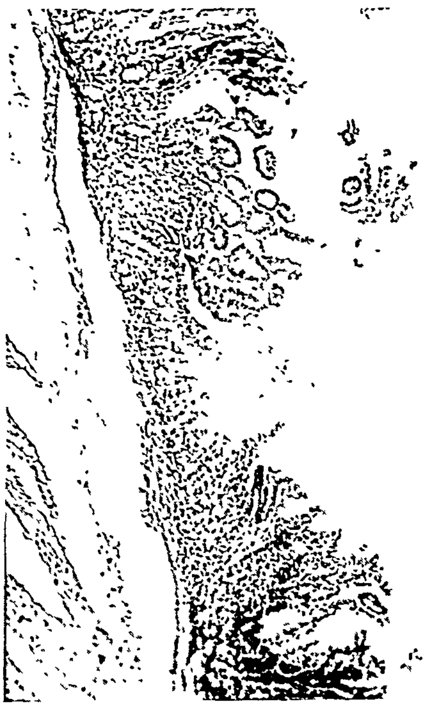

Fig. 7 (*Experiment 76; histamine dose, 2.5 mg.; guinea pig killed three hours after injection*).—Superficial ulcer in the stomach. The surrounding mucous is normal.

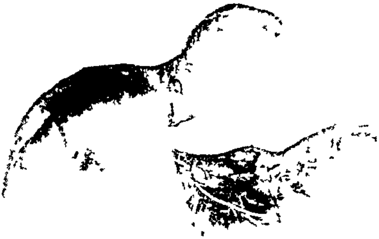

Fig 8 (*Experiment 77 histamine dose 5 mg, guinea pig killed six hours after injection*) —Deep sharply circumscribed ulcer in the pyloric antrum seen from the outside

of interest to elucidate the development during shorter periods With this aim in view I conducted an investigation in which the animals were killed at specific shorter intervals after the histamine injection The experimental animals used were guinea pigs, the investigation comprising 15 in all Each animal was given the same injection of histamine 5 mg The duration of effect ranged from half an hour to six hours The results are set forth in Table 2

In 1 case, after only half an hour multiple hemorrhages occurred in the stomach (Fig 3)

In 1 case after one hour, there was a small circumscribed duodenal hemorrhage After three hours 3 macroscopically visible ulcers were found in the stomach in 1 case (Fig 6) All three ulcers were located contiguously, immediately proximal to the pylorus Figure 7 shows the microscopic appearance of a section through the margin of one of the ulcers In another case, also after three hours, a rather deep ulcer occurred in the pyloric antrum After four to six hours, deep ulcers were found in the duodenums of several animals Figure

Table 2 —*Effect of 5 mg Histamine Dose for One Half to Six Hours*

Time hrs	No of animals	Positive results	Negative results	Changes in duodenum			Changes in stomach		
				Deep ulcers	Superficial ulcers	Bleeding	Deep ulcers	Superficial ulcers	Bleeding
½ hour	2	1	1						Multiple
1 hour	2	1	1			1			
2 hours	2	1?	1		1?				
3 hours	3	2	1		1		1		Multiple
4 hours	2	1	1	1					
5 hours	2	2	0	1	1				
6 hours	2	2	0	1			1		

8 shows a deep ulcer in the pyloric antrum after six hours. The preparation was photographed from the outside. The sharply circumscribed ulcer was on the point of perforating; only a thin serous membrane remained.

SUMMARY

Employing the histamine-in-beeswax method, the author studied the rapidity of development of acute ulcers in the stomachs and duodenums of guinea pigs. The effect of a single injection of histamine during twenty-four hours was observed, as was the effect of histamine in doses ranging from 0.1 mg. to 10 mg. The smallest dose after which ulcers were observed was 0.5 mg.; and the smallest dose after which perforating ulcers occurred was 2.5 mg. Nineteen animals were treated with doses of 5 mg.; ulcers occurred in 16 (84 per cent) of them. In 9 of these, perforating ulcers were observed. Of 31 animals treated with doses ranging between 2.5 mg. and 10 mg., perforating ulcers occurred in 15. The ulcers were observed in the stomach, in the duodenum or in the two organs simultaneously. There was a considerable preponderance of duodenal ulcers. The ulcers were of two types: solitary, well circumscribed ulcers, and multiple, extensive, superficial, irregular ulcers with a pronounced tendency to bleed. The former type, which was the commoner, was observed both in the duodenum and in the stomach, preponderantly in the duodenum; the latter type was observed in the stomach alone.

The effect of a dose of histamine during shorter periods than twenty-four hours was also studied. In 1 case a solitary hemorrhage was observed in the mucous membrane after half an hour. A microscopic ulcer occurred after one hour, and macroscopically evident ulcers appeared after three hours.

From this investigation it may be concluded that the entire ulcerous process, from onset to perforation of the wall, may be completed in an extremely short time, i.e., less than twenty-four hours. The changes provoked by histamine in the mucous membrane seem to be localized exclusively in the region of the ulcer, the mucous membrane outside the ulcer presenting a normal picture.

RÉSUMÉ

Utilisant la méthode employant l'histamine dans le miel de ruche, cet auteur a étudié la rapidité avec laquelle se développent les ulcères aigus dans l'estomac et le duodenum du cobaye. On observa l'effet d'une soule injection d'histamine en vingt-quatre heures, et l'effet de l'histamine à doses allant de 0, lmgm à 10 mgm. La dose minima après laquelle on observa le développement d'un ulcère, fut de 0,5 mg. et la plus faible dose après laquelle survint un ulcère perforant fut de 2,5 mgm. 19 animaux furent traités par doses de 5 mgm., 16 d'entre eux, soit 84% firent des ulcères, et parmi ceux-ci, 9 d'entre eux présentèrent des ulcères perforants. Parmi les 31 cobayes traités à des doses allant de 2 mg. 5 à 10 mgm, 15 animaux présentèrent des ulcères perforants. Ces ulcères étaient situés dans l'estomac, le duodénum ou dans ces deux organes à la fois. Il y avait prépondérance importante de l'ulcère duodénal. Ces ulcères étaient de deux types: solitaire, bien circonscrit et multiple, de fortes dimensions, irréguliers et superficiels avec forte tendance à l'hémorrhagie. Le premier type, le plus fréquent, se trouvait à la fois dans le duodenum et l'estomac surtout dans le duodenum, cependant. Le second type se trouva seulement dans l'estomac.

L'on étudia aussi l'effet d'une dose d'histamine durant des périodes plus courtes que 24 heures. Dans l'un de ces cas, une hémorrhagie isolée de la muqueuse se produisit après une demi-heure. Un ulcère microscopique se produisit après une heure et d'autres, perceptibles à l'oeil nu, apparurent après trois heures.

L'on peut donc conclure d'après ces recherches que le processus ulcèreux entier, de sa genèse à la perforation complète tissulaire peut se produire en un temps extrêmement court, c'est-à-dire, en moins de vingt-quatre heures. Les changements provoqués par l'histamine dans la muqueuse semblent être localisés exclusivement dans la région où est situé l'ulcère, le reste de la muqueuse demeurant normale.

RESUMEN

El autor estudia la rapidez del desarrollo de la úlcera aguda en el estómage y duodene de cobayes empleando el método de la histamina

en cera de abeja Se observa el efecto de una inyección de histamina durante 24 horas, así como el efecto de la histamina en dosis variables de 0,1 mg a 10 mg Las dosis mas pequeñas tras la cual se observé el desarrollo de ulceras fué de 0,5 mg , y la desis mas pequeña tras la cual se presentaron ulceras perforantes fué de 2,5 mg Se trataron 19 animales mediante desis de 5 mg , presentandose ulceras en 16 (84 por ciento) de las mismas En 9 de estos se observaron ulceras perforantes De los 31 animales tratados con dosis que variaren entre 2,5 mg y 10 mg se desarrollaron ulceras perforantes en 15 observandose las ulceras en el estómago, en el duodeno, o en los dos órganos simultaneamente, y habiendo considerable predominancia de las ulceras duodenales Las ulceras eran de dos tipos solitarias, bien circunscritas y multiples extensas superficiales, irregulares, con marcada tendencia a la hemorragia El primer tipo que fué el mas frecuente se observo en el duodeno y en el estomago, especialmente en el duodeno observandose el segundo tipo solamente en el estómago

El efecto de una dosis de histamina durante periodos mas cortos de 24 horas fueron tambien estudiados por el autor En un caso se observó una hemorragia solitaria en la membrana mucosa despues de media hora desarrollándose una ulcera microscopica despues de una hora, y apareciendo ulceras macroscópicas al cabo de 3 horas De estas investigaciones puede deducirse que todo el proceso ulceroso, desde el comienzo hasta la perforación de la pared gastrica, puede completarse en un periodo de tiempo extremadamente corto que puede ser de menos de 24 horas Los cambios efectuados por la histamina en la membrana mucosa parecen localizarse exclusivamente en la región de la ulcera presentando un aspecto normal la mucosa situada alrededor de la úlcera

RIASSUNTO

Utilizzando l'istamina in cera di api l'A ha studiato la rapidita' di comparsa di ulceri acute nello stomaco e nel duodeno della cavia L'A ha controllato l'effetto di una sola iniezione di istamina durante un periodo di 24 ore come pure la conseguenza di dosi di istamina oscillanti da 0 1 a 10 mg La dose minima per la comparsa di un'ulcera e' stata di 0,5 mg per un'ulcera perforante di 2,5 mg Sopra 19 cavie iniettate con 5 mg , in 16 (84%) e' occorsa un'ulcera perforante Sopra 31 cavie iniettate con dosi oscillanti da 2,5 a 10 mg l'ulcera perforante e' comparsa in 15 Le ulcerazioni sono state riscontrate nello stomaco, nel duodeno, o in ambedue contemporaneamente Esse erano o solitarie, bene circoscritte oppure multiple, estese, superficiali, a margini irregolari, con una spiccata tendenza ad emorragie La prima varieta', piu' comune, e' stata riscontrata sia nello stomaco, sia piu spesso nel duodeno, la seconda invece solamente nello stomaco

L'effetto di una sola dose di istamina per un intervallo piu' breve di 24 ore e' stato pure indagato In un caso si e' manifestata un'emorragia solitaria nella mucosa gastrica mezz'ora dopo l'iniezione Un'ulcera microscopica era gia' evidente dopo un'ora ulceri visibili macroscopicamente dopo 3 ore

Di queste ricerche risulta che il processo ulcerativo completo cioe' fino alla perforazione delle pareti, puo' effettuarsi in un brevissimo intervallo di tempo meno di 24 ore Le lesioni indotte dall'istamina sembrano localizzate nella zona dell'ulcera al di fuori della zona ulcerata la mucosa gastrica presenta infatti un aspetto normale

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A Study Based on Forty-One Years of Thyroid Surgery*

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THE FIRST part of this presentation was concerned with thyrotoxicosis, thyroidectomy for nonmalignant goiter and the various aspects of exophthalmos. The second part will deal with (*a*) malignant disease of the thyroid, (*b*) the Hurthle cell tumor, (*c*) aberrant goiter, (*d*) acute and subacute thyroiditis, (*e*) thyrotoxicosis in pregnancy, (*f*) mental disease associated with thyrotoxicosis, (*g*) low basal metabolic rate in cases of thyrotoxicosis, (*h*) thyroidectomy in the treatment of children and adolescents, (*i*) injuries to the laryngeal nerves, (*j*) accidental removal of parathyroids, (*k*) hyperthyroidism and hyperparathyroidism, (*l*) arterial embolism and embolectomy, (*m*) air embolism, (*n*) keloid formations, (*o*) postoperative implants, (*p*) accidental injuries to the trachea, (*q*) sternotomy, (*r*) recurrence after thyroidectomy and (*s*) anti-thyroid medication.

MALIGNANT DISEASE OF THE THYROID

In 11,662 cases in which operations were performed on the thyroid there were 192 in which malignant disease was present—an incidence of 1.6 per cent. In these 192 cases 176 thyroidectomies were performed and 4 tracheotomies made. In 12 the condition proved inoperable.

Table 1 records the pertinent data on 5,696 nonmalignant nodular goiters. If to these are added 183 malignant nodular goiters a sum total of 5,879 thyroidectomies for nodular goiter is obtained—an incidence of 3.1 per cent malignancy.

The data in Table 1 also cover 3,189 nonmalignant diffuse parenchymatous goiters. If to these are added the two malignant conditions observed in diffuse parenchymatous goiters, the sum total will be 3,191 thyroidectomies for diffuse parenchymatous goiter—an incidence of 0.06 per cent malignancy.

Also included in Table 1 are 1,958 nonmalignant diffuse colloid goiters. If to these are added the 7 malignant conditions observed in cases of diffuse colloid goiter, the sum total will be 1,965 thyroidectomies for diffuse colloid goiter—an incidence of 0.35 per cent malignancy.

In Table 5 appear data on the incidence of malignancy and mortality, together with the causes of death. Of the 18 patients who died in the hospital, 7 had toxic goiter, 8 had nontoxic goiter, 1 had malignant thyroiditis and 2 had malignant strumitis. The cause of death was pulmonary in 6 cases, cardiac in 2 and cerebral in 2, in 4 cases death was due to shock and in 1 to thyroid crisis. In 3 cases the cause was undetermined.

Of the survival periods at home the longest was thirteen years, the shortest, eleven days and the average, six months.

The high mortality rate in these cases is attributable to the fact that in most of them the malignant condition was far advanced.

Table 6 represents a classification of the types of malignant disease encountered under the two main heads of carcinomatous and sarcomatous neoplasms. Summarizing, the most commonly malignant thyroid tumors in this series were (1) adenocarcinoma, 70, (2) papillary adenocarcinoma, 30, (3) carcinoma, 22, (4) malignant fetal adenoma, 14, (5) giant cell carcinoma, 9, (6) medullary carcinoma, 3 and (7) Hurthle cell carcinoma, 3.

This survey shows clearly that a better, more comprehensive, more contracted and more clearly coordinated classification is imperative. This can be outlined only by expert pathologists of unquestioned authority.

Acute Malignant Disease of a normal thyroid is extremely rare; I observed only 1 case. The patient was a woman about 28 years of age, a teacher. Apparently her thyroid had always been normal. The condition started suddenly, with all the symptoms of acute pain

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*Continued from Special (May) Issue

TABLE 5.—*Incidence of Malignancy and Mortality: Causes of Death*

Thyroid operations	11,662—192 malignancies (1.6%)
Nodular colloid goiters	5,879—183 malignancies (3.1%)
Diffuse parenchymatous goiter	3,191— 2 malignancies (0.06%)
Diffuse colloid goiters	1,965— 7 malignancies (0.35%)
Recurrent goiters	71— 3 malignancies (4%)
Total mortality from malignant disease	50 of 192 (26%)
Death in hospital	18
Death at home	32

TABLE 6.—*Pathologic Picture in Cases of Malignant Disease*

CARCINOMA

		Number	Toxic	Nontoxic
ADENOCARCINOMA	Grade 1	11	6	5
	Grade 2	12	8	4
	Grade 3	10	6	4
	Grade 4	7	5	2
	Not graded	30	12	18
Medullary carcinoma	Grade 4	2		2
	Not graded	1		1
Malignant fetal adenoma	Grade 1	3	3	
	Grade 2	1	1	
	Not graded	10	5	5
PAPILLARY ADENOCARCINOMA	Grade 1	3		3
	Grade 2	9	4	5
	Grade 3	5	2	3
	Not graded	13	2	11
Alveolar carcinoma	Grade 3	3	1	2
GIANT CELL CARCINOMA	Grade 3	1	1	
	Grade 4	7	6	1
	Not graded	1	1	
SPINDLE CELL CARCINOMA		1		1
ROUND CELL CARCINOMA	Grade 4	1		1
SCIRRHOUS CARCINOMA	Grade 2	1	1	
	Not graded	1	1	
FIBROCARCINOMA		2	2	
MALIGNANT CYSTADENOMA		1		1
CELLULAR CARCINOMA		1	1	
PAPILLARY ADENOMA		1	1	
SMALL CELL CARCINOMA		1		1
LANGHANS PROLIFERATING ADENOMA		1		1
SQUAMOUS CELL CARCINOMA		1		1
EPIDERMOID CARCINOMA, (metastasis to thyroid gland)	Grade 2	1	1	
CARCINOMA		22	14	8
PRECANCEROUS HYPERPLASIA		1	1	
HÜRTHLE CELL CARCINOMA		3	2	1
SARCOMA				
GIANT CELL SARCOMA	Grade 4	2		2
RETICULUM CELL SARCOMA		1		1
SARCOMA		1		1
FIBROSARCOMA		1		1

ful thyroiditis with fever; the tumor grew rapidly to a large size and quickly caused pressure symptoms demanding emergency tracheotomy; the patient died soon after. Microscopic examination revealed adenocarcinoma. The duration of the whole episode was exactly one month This was the most rapidly fulminating malignant tumor I have seen in any organ

In another case a *diffuse parenchymatous goiter* contained small Hurthle cell adenomas The presence of these tiny adenomas should exclude this particular case from the category of genuine diffuse parenchymatous goiter

In fact, all the cases in which malignancy developed in genuine diffuse parenchymatous goiter are open to the same suspicion There is no way of being sure beforehand that when the gland became malignant it was actually and completely a genuine diffuse parenchymatous gland *unmixed* with tiny, barely visible adenomas which became the starting point of malignancy

I have never seen a malignant condition develop in any of my thyroidectomized patients save 1 This was a child 6 years old, on whom I operated for a benign large multinodulated colloid goiter *Fifteen years later* the patient came back with a malignant goiter, of the Hurthle cell type, she was operated on again and was still living and well two years later

This was not a recurring malignant tumor, since microscopic examination at the first operation showed it to be a benign nodular goiter. The gland left at the time of the first operation was no longer normal, probably it contained tiny colloid nodules which later grew and gave rise to the malignant goiter

Hyperthyroidism in Malignant Goiters—Malignant goiters may exhibit all the classic signs of thyrotoxicosis, such as nervousness tachycardia, tremor, ocular signs and an increased basal metabolic rate One of my patients had severe exophthalmos and after operation died of thyroid crisis This was not a case of malignancy developing in a diffuse parenchymatous toxic goiter, the condition occurred in a preexisting nodular goiter of long standing

In my series, about 50 per cent of all malignant tumors were associated with some of the classic signs of hyperthyroidism including hypermetabolism In most cases the hyperthyroid signs responded to antithyroid medication and external roentgen therapy

Can malignant tumors of the thyroid produce thyrotoxicosis?

The weight of evidence is that malignant cells do secrete thyroid hormones Classic is Von Eiselberg's case of total thyroidectomy for malignant goiter The patient remained well After a few years a tumor appeared on the outer border of the liver The tumor was excised Microscopically it proved to be a metastatic thyroid nodule Myxedema promptly followed, proving that the malignant thyroid nodule was the only source of thyroid secretion Furthermore, the uptake of radioactive iodine by metastatic nodules and the Geiger count seem to confirm the view that metastatic nodules are functioning

Treatment—Malignant disease of the thyroid should be treated prophylactically We advise removal of any lump in the breast because of the danger that it may be malignant, the same advice should hold good for any nodular goiter To be sure, not all nodular goiters become malignant, but a certain number will, and one does not know which Table 5 shows that about 3 1 per cent of 5,879 nodular goiters became malignant If these goiters are removed before they become malignant, the patient is largely protected against the development of malignancy In only 1 of my surgically treated patients was there subsequent malignant disease It was the child aforementioned

If a malignant goiter is still encapsulated, a radical operation can and must be done I always place radium in the operative field as soon as the operation is finished Two to three weeks after this, intensive roentgen therapy is administered

If the condition is well advanced, it is no longer possible to remove the mass completely In such instances it is my practice to remove as much as possible and then implant radium for twenty four to forty eight hours, following it with high voltage roentgen therapy two or three weeks later In my opinion, radium will have a better chance to give results if the bulky malignant mass is reduced to a much smaller volume Some surprisingly good results have been obtained

Recurrences of malignant disease call for operation if at all possible They should be treated as radically as at the previous operation, even if it involves the ligation of the common carotid *wh* [illegible] *is involved* *in the mass.* The danger of cerebral disturbances following ligation of the carotid are less apt to occur in these cases, because reduction of the blood supply to the brain has taken place gradually during the enlargement of the tumor; a collateral circulation has had time to become established.

By radical operation is meant a block dissection from the mastoid process and lower jaw, with removal of everything between the midline and the anterior border of the latissimus dorsi muscle and proceeding as far below the clavicle and the sternum as possible. It is the only chance one has to prolong the patient's life. Once in a while the surgeon will be compensated for this courage. For instance, one of the patients who came to me with an inoperable carcinoma of the thyroid was operated upon three times at his own request; his life and usefulness were thus prolonged for thirteen years.

More than three years ago I operated on a young man for a large mass, multinodulated, hard, fixed, clinically and unquestionably malignant. It was located on the left side of the neck and was closely attached to the thyroid, which did not look unduly enlarged. Biopsy of one of the lymph nodes had shown previously that it was an adenocarcinoma of thyroid origin. Complete block dissection of the left side of the neck from the mastoid down to the clavicle, with total removal of the left thyroid and isthmus was done. At the time of writing the patient is in excellent condition with no recurrence.

One wonders why the aforedescribed young woman with the fulminating cancer lived only one month, while the man with the "inoperable" carcinoma three times operated on lived thirteen years. Probably the age of the patients, the vitality and aggressiveness of the malignant cells and a natural immunity against malignant disease must be predicated. I have seen a woman carry a cancer of the breast for twenty years and die of something totally unrelated to cancer. The only conceivable explanation is that she carried a natural immunity that prevented further encroachment.

In another case the lateral wall of the trachea was invaded by a mass 2 or 3 cm. in diameter. I removed the cancer flush with the wall of the trachea, leaving the invaded area of the trachea untouched. It was a mistake. Sloughing of the area occurred, and it took weeks for the perforation to heal. In the meantime diffuse malignant invasion of the whole area took place. The patient died five months later. It would have been better if I had resected the portion of the trachea involved and inserted a tracheotomy tube.

In another of my cases the malignant growth had invaded the esophagus and perforated it, finally hanging down in the esophageal lumen like a polyp the size and length of a man's thumb. An elliptic longitudinal resection of the esophagus was done. Recovery was uneventful. Recurrence occurred eight years later, and death ensued the next year.

Solitary Nodules.—Of late, a terrifying incidence of malignancy, 20 to 24 per cent, has been claimed for so-called "solitary nodules."

That a solitary nodule *can* exist alone in a thyroid gland must be admitted, theoretically, as possible. Surely, however, it cannot be frequent, because in the great majority of instances a careful search of the specimen removed reveals one or more nodules here and there throughout the gland. True enough, cancer has apparently developed in a nodule that *appears* to be solitary; but it is not actually solitary, as the pathologic study reveals.

Why should a single solitary nodule become malignant more often than nodules in a multinodulated gland? There seems no plausible reason. Histologically and physiologically a solitary nodule does not differ in any determinable way from a nodule of the multinodulated variety. Since malignant disease of the thyroid seems usually to arise in a preexisting nodule, it follows that some one nodule must be the starting point, not because it is solitary but because it is the one in which malignancy begins.

It would be interesting to examine thousands of well authenticated "solitary nodules" and see whether the incidence of malignancy remains at so high a level.

In 856 solitary nodules which I have sifted out of my series (investigation not yet completed) there were 28 malignancies. This gives an incidence of 3.2 per cent for malignancy in solitary nodules. Only the nodules diagnosed microscopically as "solitary" were chosen.

It was interesting to note that as the number of solitary nodules found increased, the ratio incidence of malignancy dropped correspondingly

In conclusion Since the incidence of malignancy in 5,879 nodular goiters is 3 1 per cent since the immediate death rate of thyroidectomy in 192 cases of malignant goiter is 26 per cent and since the mortality of thyroidectomy for benign goiter is 0 3 per cent there should be no hesitation in advising operation

If a preexisting nodular goiter shows a sudden tendency to grow faster and become harder than in the past *that nodule is undergoing malignant change* No time should be lost, it must be removed

The *prophylactic treatment* of malignant disease of the thyroid is *removal of every nodular goiter*

HURTHLE CELL TUMORS

Hurthle cell tumors are composed of large eosinophilic cells They are said to originate from the ordinary epithelium of the thyroid Apparently they are not due to any embryologic cellular remnants but to some kinds of variants which are said to occur in tumors of various organs If there was ever a more obscure and meaningless explanation I do not know of it

TABLE 7 —*Hurthle Cell Tumors in 3 043 Thyroidectomies**

Diffuse parenchymatous goiter with small celled Hurthle cell adenomas	Benign	2	
	Malignant	1	3
Nodular colloid goiter	Benign	12	
	Malignant	4	16
Benign	Toxic	5	
	Nontoxic	9	
Malignant	Toxic	1	
	Nontoxic	4	
Ages 19 to 78 years, average 45 years			
Benign tumors	Male	1	
	Female	13	
Malignant tumors	Male	1	
	Female	4	
Distant results	Benign—	13 well 1–15 years later	
		1 unknown	
	Malignant—	3 well from 1 to 2 years	
		2 unknown	

*Total 19, incidence 0 62%

As is shown by my series, these growths are not common Most of them are benign in that they grow slowly are well encapsulated, do not metastasize and do not recur after removal

The behavior of malignant growths of this type does not differ from that of other malignant thyroid tumors except that they appear less malignant than others—the giant cell carcinoma for example

ABERRANT GOITER

Of the 5 cases in which my diagnosis was “aberrant” goiter, only 2 proved to be genuine instances of this condition

In 1922 a girl 19 years old was operated on by me for a nodular colloid goiter, microscopically not malignant An accessory thyroid nodule the size of a small egg was observed on the left side of the neck No others were present Microscopically this proved to be a colloid nodule with no sign of malignancy It had no connection whatever with the thyroid and was located on the outer side of the carotid and the jugular vein

Thirteen years later this patient returned with a nodule at the left sternoclavicular junction, extending below into the upper mediastinal space Operation showed one nodule directly in front of the trachea in the upper mediastinal space, another completely intrathoracic and a third entirely behind the trachea, which it displaced forward and to the right Exploration of the right side of the neck gave totally negative results

Microscopic examination showed no sign of malignant degeneration The nodules were of the nodular colloid type

In the second case there was a lingual goiter, not malignant

In the third case a nodular colloid goiter was present at the expense of the thyroglossal duct, therefore it was not aberrant

In the fourth case the tumor was microscopically a neurofibroma

In the fifth case an extruded cystic nodule was located in the upper mediastinum but attached to the lower pole of the right lobe of the thyroid by a “pedicle” This feature excluded the nodule from the aberrant thyroid class

For the sake of clearness it should be understood that aberrant, ectopic and accessory thyroid tissue, differentiated or undifferentiated, are synonymous. The requirement for definition is that the aberrant thyroid tissue has no direct connection whatever with the main body of the thyroid; otherwise it is not aberrant. If a pedicle, no matter how long, is present, the nodule is not an aberrant nodule. Most probably it is a nodule that has become extruded from the thyroid and in the course of time has become almost totally independent except for its fibrous connection.

Accessory thyroid nodules may be either median or lateral. Median accessory thyroids originate from the *median anlage,* which gives rise to the thyroglossal tract; lateral accessory thyroids originate from the *lateral anlage,* referred to as *postbronchial bodies.*

A little embryologic information at this point is necessary.

As known in early embryologic life, proliferation takes place in the midcentral portion of the pharynx. It gradually undergoes hyperplasia, descends caudally between the two halves of the tongue, and passes in front of the hyoid bone and the thyroid cartilage, forming a tract known as the thyroglossal duct. After reaching below the cricoid cartilage it bifurcates into two buds which will become the lateral lobes of the thyroid, the stalk forming the isthmus. During this whole process the thyroglossal tract remains in the median line. This medium proliferation is known as the "median anlage."

At about the same time there appear also two other proliferations on the lateral wall of the pharynx. These are known as lateral anlagen, or postbronchial bodies. They proliferate, extend caudally, come into contact and fuse with the proliferating median anlagen.

Whether the fusion of the median and lateral anlagen give rise to the thyroid gland or not has been much debated. It is regarded as probable.

After the thyroid gland is formed, the thyroglossal duct ordinarily disappears, leaving behind a fibrous tract. However, it does not always regress; it may remain as a tract containing active thyroid cells, hence the formation of the *pyramidal process.*

Hence, also, the origin of all sorts of pathologic conditions, such as colloid cystic nodules, thyroglossal fistulas and malignant tumors. The characteristic of all these tumors is to be always in the median line. They may be observed in the tongue, in the neck at all levels and even in the mediastinum, but always in the median line. Mediastinal goiters are accounted for by undifferentiated thyroid cells pinched off and carried away and downward when the heart separates from the thyroid and descends into the chest.

As for the *lateral anlagen* which give rise to the *postbronchial bodies,* they also regress and disappear. However, they too may leave behind undifferentiated postbronchial cells, which may proliferate at a later date, organize into thyroid tissue and thus form all sorts of nodules, colloid or cystic, the essential characteristic of which is to be totally similar to the thyroid groups. These nodules are lateral; they are known as aberrant lateral thyroid nodules. There is nothing to indicate that they are physiologically different from the thyroid itself. The weight of evidence seems to indicate that they function biologically as does the thyroid.

A claim is made that lateral aberrant thyroid tumors are metastases originating from the thyroid lobe on the same side. In my opinion many of such claims are not warranted, because the descriptions speak of "metastatic lesions in lymph nodes." Of course there is no question in such cases that a metastatic condition exists, originating primarily from the thyroid, whose usual behavior is to metastasize in the tributary lymph nodes. No matter how many metastatic cells are present in a lymph node it remains a lymph node; this does not make it an aberrant thyroid nodule. To claim that such nodules are aberrant thyroid tumors is embryologically and histologically incorrect. A true and genuine aberrant thyroid nodule has not the structure of a lymph node but that of genuine thyroid tissue with all its attributes.

Now, since one of the attributes of the thyroid is to be refractory to metastases from elsewhere, it becomes difficult to admit that all these aberrant lateral thyroids can readily harbor metastases. In fact they do not, any more than a malignant tumor of the thyroid metastasizes readily into the next lobe; rather, it invades by extension instead.

Furthermore, there is no possibility of denying that genuine aberrant thyroids exist which are benign They are not all malignant from the start There is no lesion that is malignant from the start It may become malignant just as a tumor of the thyroid may become malignant Since it is admitted that these aberrant thyroid nodules are embryologic remnants of undifferentiated thyroid cells which much later in life become differentiated into aberrant thyroid nodules, they are necessarily benign at first and remain so until they undergo malignant change

Furthermore, they are all congenital unless it can be proved that they are nodules extruded from the thyroid

The "plunging goiter" of the French is an aberrant goiter It projects into the thorax comes up suddenly into view when the patient coughs and then disappears again into the chest It has no connection whatever with the thyroid gland, it is a genuine aberrant goiter I observed 1 such case while I was Kocher's assistant

THYROIDITIS

Acute and Subacute Thyroiditis—Both types of thyroiditis are of inflammatory origin, bacterial, viral or otherwise

One hot summer evening a young physician was sitting on his front porch trying to cool off He had been perfectly well Suddenly he felt chilly and very nervous tachycardia (rate over 150) developed I was called to see him I found him typically thyrotoxic sweating profusely, extremely nervous and agitated with marked tachycardia marked tremor, definite brilliancy of the eyes and Dalrymple sign The temperature was 100 F The thyroid was mildly and diffusely enlarged firm and painful to touch Swallowing was painful the pain radiating up to the ears The diagnosis was acute thyroiditis Bed rest was prescribed, plus applications of ice to the neck (This was before the era of Lugol's solution) Recovery took place in about ten days The thyroid enlargement subsided and after a few weeks the gland was not palpable The subsequent course was uneventful

Of course, this was an acute condition Ordinarily these conditions are subacute and do not come to abscess formation

Whether *subacute thyroiditis* leads to chronic thyroiditis, Hashimoto's disease and Riedel's disease is not certain There is a great deal of doubt about it

Treatment Acute and subacute thyroiditis are not surgical conditions Ice packs, antipyretics and roentgen treatment will usually control the situation

Tuberculosis of the Thyroid—Tuberculosis of the thyroid is rare Of my series of 11,662 cases it occurred in only 1

The diagnosis is seldom made before operation, it really depends on microscopic study Clinically the condition resembles subacute thyroiditis, with all its clinical earmarks It assumes the form of miliary tuberculosis, it is rarely caseous

Syphilis of the Thyroid—Syphilis of the thyroid is exceedingly rare Of my 11,139 cases in which thyroidectomy was done, only 2 were cases of syphilis The first was a case of diffuse syphilitic thyroiditis, with demonstrable spirochetes throughout the gland The patient was a woman 61 years of age, who complained of thyrotoxic and mechanical symptoms caused by a large nodular goiter Serologic examination gave positive results In the second case there was a chronic inflammatory reaction without evidence of malignancy. Again the serologic reactions were positive

Syphilis of the thyroid assumes two forms: (1) diffuse thyroiditis, occurring sometimes during the secondary stage of syphilis and (2) a tertiary lesion in the form of a gumma

THYROIDITIS, CHRONIC AND ACUTE

Chronic Thyroiditis—For the sake of clarity let me state that *Riedel's struma and woody or ligneous thyroiditis* are the same Also let me state that struma lymphomatosa, Hashimoto's disease and lymphadenoid goiter are the same thing

Etiology and Differential Diagnosis—The cause of Riedel's disease and struma lymphomatosa is still unknown

In Riedel's strumitis the thyroid is hard, so hard that it has been called "Eisenharte strumitis" by the Germans and "Woody thyroiditis" by the French This hardness is the reason it is often confused with malignancy

Woody thyroiditis predominates in the female (95 to 5 per cent) It is not frequent in young persons but is most commonly observed

TABLE 8.—*Riedel's Struma (99 Cases)*

Riedel's struma or Woody thyroiditis	56 cases
Struma lymphomatosa or Hashimoto or Lymphadenoid	43 cases
Total	99 cases
Percentage incidence in 11,139 thyroidectomies = 0.88	

Males — 5 cases or	5%
Females—94 cases	95%

Age incidence from 19-76 years
Average age—44 years

Toxic	68
Nontoxic	30
Malignancy	1
Recurrence	None

	Riedel's struma	Struma lymphomatosa
Normal	18	13
Increased	24	17
Diminished	10	13
Unknown	4	0

in adults and elderly persons. The average age is 44 years.

It occurs more frequently in diffuse parenchymatous thyroids than in the nodular colloid type.

In Riedel's disease the fibrosis not only involves the gland itself but permeates, like a drop of oil, the adjacent structures, the carotid, the trachea, and the esophagus, as well as the whole prevertebral region.

Unlike malignant disease, which starts at one point and proceeds to invade gradually the whole gland, Riedel's disease involves the whole gland from the start, the pyramidal process included. Involvement may be more marked in the right lobe, but the whole gland is nevertheless involved. This explains why the gland usually retains its uniform anatomic contours and form.

Naturally, if a colloid nodule is present before the onset of the disease, the surface will be bosselated or even nodular.

In the struma lymphomatosa of Hashimoto, often much the same picture is observed. Hardness is present and could easily be mistaken for evidence of Riedel's thyroiditis, were it not for the fact that the thyroid with Hashimoto's disease can be freely mobilized, whereas Riedel's struma is fixed.

The fundamental difference between Riedel's struma and Hashimoto's disease is that the Riedel fibrosis extends to all the surrounding structures of the neck, invading the trachea, esophagus, vascular cord and fascia, so that the thyroid seems to be frozen in a mass of connective tissue, whereas the Hashimoto thyroid is not lost in an atmosphere of fibrosis; it can be moved more or less freely.

The microscopic picture is dominated by intense fibrosis with infiltration of lymphocytes and plasma cells. Mononuclear cells and eosinophils are encountered. The cirrhosis extends to the whole thyroid and finally to the surrounding structures of the neck. Foreign body giant cells are encountered, resembling those associated with tuberculosis.

In Hashimoto's disease the histologic characteristic is not fibrosis, although this is present, but an intensely diffuse lymphoid infiltration and an extensive distribution of eosinophils throughout.

The histologic patterns of these two conditions, though differing considerably on the surface, seem to be developed on the same related principles and suggest a possible etiologic relationship.

Whether Riedel's disease and struma lymphomatosa are different pathologic entities or are different stages of the same disease is still a much discussed question. What produces struma lymphomatosa in one instance and Riedel's disease in another is not known; whether the fibrosis of Riedel's disease is the terminal stage of Hashimoto's disease is also by no means clear. However, the general behavior of the two conditions suggests that they are two different responses to the same cause.

Surgical Treatment: In both instances, a subtotal thyroidectomy is performed. It is wise to leave a generous amount of thyroid tissue in order to guard against exaggerated postoperative hypothyroidism. It is remarkable to see how a Riedel's gland, hard and fibrous at the time of the operation, will be softened up a few months after thyroidectomy. The distant results are good, except for some persisting moderate hypothyroidism.

The results obtained by roentgen treatments are disappointing. A hard, fibrous Riedel's thyroid does not respond well to irradiation. In fact, irradiation increases the fibrosis and

TABLE 9.—*Goiter and Pregnancy*

Thyroidectomy in pregnant women (all pregnancies from 2 to 6 months; condition of offspring good; no monstrosities)			52	0.4%
Miscarriage			0	
Death			0	
Diffuse parenchymatous toxic goiter			17	33%
Nodular colloid goiter	Toxic	23		
	Nontoxic	1	24	46%
Diffuse colloid goiter	Toxic	10		
	Nontoxic	1	11	21%
Malignant goiter			0	

serves only to accentuate the complaints of the patient and the difficulties of surgical manipulation.

THE THYROID IN PREGNANCY

Treatment.—If the thyrotoxicosis is moderate, every effort should be made to carry the patient along with medical means until after delivery. Lugol's solution should be given with care. Few roentgen treatments over the thyroid can safely be given and no thiouracil and *no radioactive iodine should be used. One can*not know what ill effect they may have on the offspring. After delivery the goiter may be handled as conditions demand.

On the other hand, if thyrotoxicosis is severe, the patient must be prepared for operation. Lugol's solution, intravenous iodides, roentgen treatments and all other medical means are used to make the patient safely operable. Thyroidectomy is done in the usual way.

In operating on a pregnant woman one must bear in mind that the thyroid is *ipso facto* hyperplastic and that after delivery the hyperplasia will automatically retrocede. In consequence the combination of a too radical resection and a postgravid physiologic recession is bound to produce a severe hypothyroid condition.

The ideal time for operating is between the third and the fourth month of pregnancy.

Thiouracil and radioactive iodine should not be used for pregnant women. Since thiouracil produces enlargement of the thyroid in adults it stands to reason that it will affect the gland of the fetus in the same way. This is evidenced by *the few congenital goiters already observed* after the use of thiouracil. Whatever effect it may have on the other organs of the fetus is not known. The same holds true of radioiodine.

MENTAL DISEASE AND THYROTOXICOSIS

If by thyrotoxic insanity we mean an acute *mental derangement occurring in a previously* normal mind but in which the mental aberration has taken place in conjunction with a severe thyrotoxic state, such as the three women I have observed who felt intermittently an intense desire to kill their children, such as those two severe thyrotoxic patients who in a fit of mental insanity committed suicide, such as the man who, prior to the incidence of his thyrotoxic goiter was an unassuming and steady worker, but who during the course of his thyrotoxicosis developed a state of mind characterized by loss of mental proportions, ideas of grandeur, etc. and who in one afternoon bought three automobiles giving spurious checks for them, I should say that these types of mental derangement and some others on the same order, are and should be *regarded as thyrotoxic insanity. The proof* is that the three women and the man made an immediate recovery after thyroidectomy, and have remained mentally well since. The same is true for the following case I have observed: a woman, aged 52 years, who had a large nodular goiter, which caused mechanical symptoms and which became secondarily toxic. The patient developed violent agitation, mental aberration, and loss of orientations, hallucinations. Thyroidectomy made the mental condition worse. In fact the postoperative insanity became so marked that she became *unmanageable and* was transferred to an institution, where she remained three months. After that, she recovered entirely and never experienced any return of her mental trouble. A checkup fifteen years later showed her still well.

Although hysteria is observed in conjunction with thyrotoxicosis it would be a mistake to claim that the majority of thyrotoxic patients are hysterical. A true thyrotoxic patient usually is not hysterical. He looks his physician straight in the eyes, answers questions straightforwardly and above all shows no response *to suggestion.*

Here one should *not forget that incipient*

TABLE 10.—*Mental Disease and Thyrotoxicosis*

Psychoses connected with diffuse parenchymatous goiter	17
Psychoses connected with diffuse colloid goiter	6 (5 toxic, 1 nontoxic)
Psychoses connected with nodular colloid goiter	44 (41 toxic, 3 nontoxic)
Thyrotoxic insanity with diffuse parenchymatous goiter	6
Thyrotoxic insanity with nodular colloid goiter	1
Total number of cases of mental disease	74 (0.66%)
Postoperative mortality	1

thyrotoxicosis may be accompanied with mental manifestations.

Moods of depression and anxiety, morbid ideas, delusions, jealousy, fear, irritability, quarrelsome disposition and impulsive obsessions and acts are sometimes typical manifestations of impending thyrotoxicosis.

After perusing the tables one comes to the conclusion that the relation between the various mental ailments and the thyroid disturbances has probably no etiologic meaning except in cases of thyrotoxic insanity. Perhaps all that one can say is that mental derangements were more numerous in cases of nodular colloid goiters than in cases of the parenchymatous type. This, again, is of no great significance if one considers that nodular goiters are most frequently present in elderly persons, in whom psychoses are apt to develop.

In conclusion, psychoses may occur in connection with thyrotoxicosis. Ordinarily, psychoses are not induced by the thyrotoxic state but usually precede it. In such instances they are not of thyroid origin. However, it seems that the existence of a true thyroid insanity cannot be denied.

THYROTOXICOSIS WITH LOW METABOLISM

It seems inconsistent to say that thyrotoxicosis may be present coincidentally with hypometabolism. To be sure, in the majority of cases of thyrotoxicosis hypermetabolism is present, the metabolic elevation being usually in direct proportion to the severity of the disease; but this is by no means always the fact. I have observed several cases in which the thyrotoxic syndrome was accompanied with a low metabolic rate. In 1 case of unques-

TABLE 11.—*Mental Derangement**

Nodular colloid goiter	
Schizophrenia	1
Dementia praecox	2
Paranoid	2
Toxic psychosis	1
Manic depressive psychosis	9
Melancholia	3
Hallucinations	3
Psychosis	4
Psychoneurosis	2
Mental delusions	6
Senile dementia	1
Mental instability	2
Anxiety neurosis	2
Hypomanic behavior	1
Insanity	1
Maniacal psychosis	1
Involutional psychosis	1
Hysterical neurosis	1
Thyrotoxic insanity	1
Organic dementia	1
	45

Diffuse parenchymatous goiter	
Dementia praecox	2
Acute mania	1
Manic depressive psychosis	1
Toxic psychosis	1
Psychoneurosis	2
Cardiac neurosis	2
Mental disturbances	3
Mental instability	1
Neurasthenia	1
Psychopathic	1
Paranoid ideas	1
Involutional melancholia	1
Thyrotoxic insanity	6
	23

Diffuse colloid goiter	
Manic depressive psychosis	1
Auditory hallucinations	1
Psychoneurosis	2
Mental confusion	2
	6

Results: Of the patients with thyrotoxic insanity, 5 were totally cured after thyroidectomy; 2 committed suicide before operation. Among the other psychotic patients, 34 were improved; the rest showed no improvement.

*The great majority of these diagnoses were made by competent neurologists called in to see the patients.

tioned thyrotoxic disease with marked exophthalmos the basal metabolic rate remained consistently at minus 22 The patient was a youth about nineteen years of age The interesting thing is that after operation the basal metabolic rate fluctuated between minus 10 and minus 12

Basal metabolism is the sum total of all the physical, chemical and electrical reactions taking place in the body The bodily mechanism is "geared up" to function best at certain physiologic levels These include all formative destructive and replacement cellular phenomena that take place to maintain the organism in physiologic equilibrium These reactions increase with muscular, glandular digestive and mental activities On the other hand during sleep they reach the minimum of their activity, this corresponds to what is called *true basal metabolism* This basal minimum is observed during sleep between 2 and 4 a m thus it becomes clear that this period is the ideal time to determine the basal metabolic rate However, such a procedure requires specially fitted and very expensive laboratory facilities

The next best thing, then is to take the basal metabolic rate after a night's rest with the patient's stomach empty and with complete mental and physical rest This is best done in a hospital, but again it is impossible to hospitalize every patient for this purpose Consequently, one has to resort to the *office* metabolic test If a test is taken and a discount or an addition of 10 to 12 points is made one will obtain a dependable basal metabolic rate If, for example, a rate of minus 12 is found the true rate will be approximately minus 22 to minus 24, if rate of a plus 12 is found the corrected rate would be approximately plus 2 These corrective estimates have been obtained by checking 500 "office metabolisms' against 500 "hospital metabolisms" for the same patients

One must not forget that an elevated basal metabolic rate is present in other conditions than thyrotoxicosis, e g leukemia cardiac decompensation dyspnea and hypertension Furthermore with the use of dinitrophenol which has calorigenic properties almost equal to those of thyroxin one can bring the basal metabolic rate to a very high level

There is however a fundamental difference between the high metabolism obtained with thyroxin and that produced by dinitrophenol In the first instance the high basal metabolic rate is accompanied by tachycardia nervousness tremor and brilliancy of the eyes, in other words by thyrotoxic reactions In the second instance none of these thyrotoxic reactions is present In a myxedematous patient the basal metabolic rate with dinitrophenol no matter how high will not change a particle the myxedema present but the thyroxin high metabolism will cure it This shows that "hypermetabolism' and "hypometabolism" are in no way synonymous with "hyperthyroidism and "hypothyroidism They are purely concomitant signs present in the disease

THYROIDECTOMY FOR CHILDREN AND ADOLESCENTS

Analysis of Tables 12 and 13 shows that

1 In both children and adolescents goiter is vastly predominant in girls 232 as against 46 boys This ratio among adolescents is almost 5 to 1

2 Among children diffuse parenchymatous goiter, whether toxic or not, and nodular colloid goiter are about equally distributed

3 In adolescents diffuse parenchymatous goiter assumes a definite lead over nodular goiter (120 to 78)

4 The ratio of toxicity in cases of parenchymatous goiter far outweighs that in cases of nodular goiter (105 to 31)

5 The large number of "toxic" diffuse parenchymatous goiters (105 of 120) observed in adolescents seems to confirm the claim of Marine and Kimball that 0 5 per cent of young persons taking prophylactic iodine show hyperthyroidism

6 Exophthalmos and malignant disease were encountered 1 case of each among 10 thyroidectomized children The number is too small for the drawing of conclusions

7 In adolescents, the ocular signs are as follows

Exophthalmos	59
Graefe	46
Moebius	27
Stellwag	13
Joffroy	8
Dalrymple	47
Staring look	47

TABLE 12.—*Thyroidectomy in Children**

1. Diffuse parenchymatous goiter	3	Toxic	3
		Nontoxic	0
		Exophthalmic	1
2. Diffuse colloid goiter	3	Toxic	1
		Nontoxic	2
		Exophthalmic	0
3. Nodular colloid goiter	1	Toxic	0
		Nontoxic	1
		Exophthalmic	0
4. Cystic	1	Toxic	0
		Nontoxic	1
		Exophthalmic	0
5. Nodular colloid malignant goiter	1	Toxic	0
		Nontoxic	1
		Exophthalmic	0
6. Thyroglossal (patient aged 11)	1	Toxic	0
		Nontoxic	1
		Exophthalmic	0

*These data pertain to the cases of 10 children between 6 and 12 years of age, inclusive. There were 7 girls and 3 boys. In 1 case malignancy was present.

TABLE 13.—*Thyroidectomy in Adolescents**

1. Diffuse parenchymatous goiter	120	Toxic	105
		Nontoxic	15
		Exophthalmic	51
2. Diffuse colloid goiter	76	Toxic	50
		Nontoxic	26
		Exophthalmic	6
3. Nodular colloid goiter	78	Toxic	31
		Nontoxic	47
		Exophthalmic	2
4. Cystic goiter	2	Toxic	0
		Nontoxic	2
		Exophthalmic	0
5. Acute strumitis, malignant	1	Toxic	1
		Nontoxic	0
		Exophthalmic	0
6. Thyroglossal	1	Toxic	0
		Nontoxic	0
		Exophthalmic	0

*A total of 278 patients between the ages of 13 and 18 inclusive. There was 1 instance of malignancy.

Treatment.—For either a child or an adolescent, thyroidectomy is done only if the goiter is nodular. Diffuse parenchymatous goiter, toxic or not, is treated medically. Thyroidectomy is strictly a last resort. In my opinion, one is not justified in using thiourea and its derivatives for young persons, whose delicate organisms are still in the formative period, since nothing is known about the distant influence of thiouracil on the endocrines, the ovaries, the adrenals, etc.

The same is true of radioactive iodine, which seems to act only as an "internal roentgen treatment." On the basis of experimental work it seems justifiable to fear that the beta and gamma rays may have an injurious effect upon the highly sensitive endocrines of the young, thus jeopardizing future health.

According to my experience with young thyrotoxic persons, the iodine treatment combined with external roentgen therapy will suffice to control the hyperthyroidism as well as the ocular signs. To be sure, patience on the part of the patient and his family is necessary, because the treatment is a prolonged one, but in the end the results are most gratifying.

If the result of conservative treatment does not justify temporizing any longer, then and only then do I resort to surgical measures.

INJURIES TO THE LARYNGEAL NERVES

In 11,139 thyroidectomies the total number of injuries to the laryngeal nerves was 21, or 0.18 per cent.

Two of the King operations performed on the same patient were failures, the first failure being my own, and the second failure being made by a consultant. The successful operation was performed by a consultant.

Anatomic Considerations.—The subject of injuries to the laryngeal nerve is too important to be treated lightly. Justice cannot be done to it unless one thoroughly understands the laryngeal anatomy. The muscles of the larynx are (1) extrinsic and (2) intrinsic. The extrinsic muscles are concerned with bracing the voice box so that the intrinsic muscles can then manipulate the cords in the process of phonation and respiration.

Both laryngeal nerves, superior and in-

TABLE 14.—*Laryngeal Nerve Injuries*

Abductor paralysis	Unilateral	6
	Bilateral	8
Adductor paralysis	Unilateral	4
	Bilateral	1
Paralysis of nerve trunk	Unilateral (1 recovery)	
	Bilateral (1 partial recovery)	
Distant results	Recovered	5
	Improved	7
	Not improved	3
	Unable to trace	2
	Permanent tracheotomy	2
	King's operation performed	3

In 11,139 thyroidectomies the total number of laryngeal nerve injuries was 21 or 0.18%.

ferior, supply the sensory and the motor innervation of the larynx

The superior laryngeal nerve is given off the vagus at the ganglion nodosum, it is both motor and sensory and divides into two branches, an external and an internal The external branch is purely motor, it supplies the cricothyroid muscle, which serves as the tensor of the vocal cords The internal branch is purely sensory and innervates the mucosa of the larynx, the epiglottis and the lower part of the pharynx It has been claimed that the internal branch contains motor fibers for the interarytenoid muscle This is flatly denied by Brien T King and others However, judging from the anatomic drawings of Nordland the interarytenoid muscle seems to be supplied by both, the superior laryngeal and the recurrent laryngeal

The *inferior laryngeal, or recurrent* laryngeal on the right side is given off at the level of the subclavian artery, swings around it and ascends toward the thyroid The left recurrent is given off in front of the arch of the aorta swings around it and ascends toward the left lobe of the thyroid Both recurrents in their ascent give off branches for the trachea and the esophagus More often than the left the right recurrent lies external to the inferior thyroid artery Both, however may course outside or inside the inferior artery or between its branches

The inferior laryngeal nerve supplies the motor branches to all the intrinsic muscles of the larynx the interarytenoid muscle included It enters the larynx at the lower border of the cricoid cartilage on its posterior surface behind the inferior cornu of the thyroid cartilage

The recurrent divides into two branches the 'anterior" and the "posterior" The anterior supplies the abductors the posterior the adductors The division may take place below the thyroid gland behind the posterior portion of the lobe or within the gland itself at the lower border of the cricoid cartilage or even beyond it when perforating the inferior constrictor of the pharynx

It is known that the inferior laryngeal nerve is composed of two bundles of fibers one for the adductor and the other for the abductor muscles as shown by Russell in 1908 It is known also that the bundle for the abductor is on the inner side of the nerve and the bundle for the adductors on the outer The two bundles are not visibly distinct, since they form one nerve Further it is known that the relative proportion of the adductor as against the abductor fibers is 3 to 1 in favor of the adductors

The true clinicosurgical significance of these facts, however escaped us until the problem was elucidated by Brien T King Surgeons could not understand why in certain instances they observed an abductor paralysis and in others an adductor paralysis

King showed that if the total nerve trunk is injured both the adductors and the abductors are paralyzed, hence the "intermediate or cadaveric" position of the cords If, on the other hand one of the divisional trunks *alone* is injured, paralysis of the corresponding laryngeal muscles supplied by the trunk will occur If it supplies the abductors it will be an "abductor paralysis", if it supplies the adductors, it will result in an "adductor paralysis" Thus it can be understood why in certain instances there is adductor paralysis, in others abductor paralysis and in still others an intermediate or cadaveric position of the cords The explanation is now obvious

Laryngeal Injuries—Injuries to the superior laryngeal nerves are less crippling than injuries to the recurrent nerves Also, they occur much less often because they are out of the field of operation Injury of the internal sensory branch deprives the laryngeal mucosa of its sensory function thus robbing it of the protective mechanism which prevents fluids from running into the larynx The trouble, however is not permanent and soon disappears

Injury of the external motor branch of the superior laryngeal nerve which supplies the cricothyroid muscle results in a husky low toned voice easily fatigued This is brought about by a loss of tension of the vocal cords because, the cricothyroid muscle being paralyzed the thyroid cartilage loses its necessary fixation, thus enables the vocal cords to contract tensely

Injury to the superior laryngeal nerve may be avoided by drawing the superior pole of the thyroid downwards visualizing it com pletely and ligating it flush with the point of entrance of the blood vessels into the pole.

Recurrent Laryngeal Nerves: Injury to the recurrent laryngeal nerves is the bane of the thyroid surgeon's existence. To the patient it is a catastrophe. Nothing can be more disastrous, except the loss of eyesight. A permanent tracheotomy is nothing pleasant to contemplate.

If an inferior laryngeal nerve injury is *unilateral* and affects the adductors, the loss of voice will be only temporary, because in the course of time the sound vocal cord will swing over the middle line and come into contact with the paralyzed one; thus phonation can take place. Respiration is not interfered with.

If the injury to the abductors is unilateral (the adductors being stronger than the abductors) the paralyzed vocal cord will be in the middle line and will remain fixed in that position. In such a case respiration will not be interfered with, nor will phonation, because the sound cord, in its free motions to and fro, allows plenty of breathing space and brings the two cords into close approximation. The patient breathes freely, phonates and even sings.

If both nerves are injured, bilateral "abductor paralysis" is produced; the vocal cords are in permanent adduction. The patient can speak well enough but cannot breathe, because the breathing space is inadequate. Tracheotomy becomes imperative.

In other instances, instead of being approximated, the cords become and remain abducted; they assume the cadaveric position; the patient can breathe but cannot talk; he has become aphonic. In such instances the adductor muscles are paralyzed on both sides.

Routine Exposure of Recurrent Laryngeal Nerves: This is the method advocated by Lahey in order to avoid injuries to the nerves. Such a precaution does not, however, rule out such injuries entirely.

I do not "routinely" expose the inferior laryngeal nerves.

One must remember that most of the injuries occur at the lower pole of the thyroid and at the point of entrance into the larynx through the inferior constrictor pharyngeal muscle. In consequence, in order to avoid those dangerous zones one must expose completely the posterolateral surface of the lobe by dislocating it forward. This is mandatory. If, under guidance of the eyes, one ligates the upper pole flush with the point of entrance of the blood vessels into the pole and cuts it, forward dislocation becomes much easier. After this has been done, the lower pole is exposed. The middle thyroid vein is clamped and cut. The veins at their point of exit of the lower pole are cut and ligated. From this point, resection of the gland is carried out under constant visualization of the field, the surgeon constantly bearing in mind the anatomic location of the nerve and avoiding it. Unless the nerve happens to follow an anomalous course (instead of coursing behind the posterior capsule) and "travels within the gland" (11 per cent according to Lahey) the chance of injury to the nerves is small. Never clamp in a pool of blood; one is almost sure to clamp anything but what is wanted.

As has just been said, one should always bear in mind the possibility of anomalies. In one of my cases there was troublesome bleeding from the level of the ligated left upper pole. Not being able to find quickly the source of the bleeding, I packed the region with gauze and directed an assistant to maintain a certain amount of pressure over it, so as to enable me to go ahead with the operation. From that time on a marked stridor appeared. After removal of the pressure and the packing, the stridor immediately stopped. Replacing of the gauze packing with pressure brought back the stridor. The field being dry, a nerve was seen to come obliquely from above downward and inward from behind the carotid and enter the larynx at the lower border of the cricoid cartilage. Thinking it might be an anomalous inferior laryngeal nerve, I proceeded to ascertain whether the left recurrent nerve was present in its normal place. It was not. The nerve just described was the left inferior laryngeal. Evidently the origin of the nerve had taken place at a high level and the nerve had chosen the shortest way to enter the larynx.

A thyroid surgeon should be thoroughly familiar with the technic of routine exposure of the recurrent nerve on its entire course up to its entrance into the larynx. In the surgical treatment of malignant growths this exposure is necessary to the performance of an adequate operation

Some transient postoperative disturbances of the voice may be due to scar tissue the result of dissecting and exposing the nerves

Treatment of Bilateral Abductor Paralysis

1 Emergency tracheotomy should be performed to relieve the obstructed respiration

2 Paralysis of the vocal cords should be corrected by King's operation

3 If King's operation is not done a permanent valved tracheotomy tube gives quite satisfactory results The gold valve moves spontaneously in and out with each inspiration and expiration thus allowing the patient to speak without covering the tracheotomy tube opening with the finger

Treatment of Bilateral Adductor Paralysis There is none Aphonia is permanent

ACCIDENTAL REMOVAL OF PARATHYROIDS (MICROSCOPICALLY ESTABLISHED)

In 16 instances 0 1 per cent of 11 139 thyroidectomies parathyroid glands were accidentally removed There was no fatality Severe and protracted courses resulted in 4 cases, in the remainder the course was mild

In order to guard against the accidental removal of parathyroids one must dislocate the thyroid forward and inward so as to expose its posterolateral surface Not much time is lost in trying to identify the parathyroids The main thing is to be sure that no parathyroids are visualized over that portion of the thyroid which is to be resected When this is made certain one may proceed with the resection feeling morally secure as far as the parathyroids are concerned

As soon as the goiter is removed and before discarding it, the surgeon should make a quick survey of the specimen to ascertain whether any parathyroids have been accidentally removed The best way to locate them is to follow the main vascular trunks in the removed specimen

How many parathyroids may be removed before tetany appears? This question cannot be fully answered It is true that one two or even three parathyroids have been removed more than once in conjunction with thyroidectomy and that no disturbance or very little has been observed as a result It would be dangerous however, to rely too much upon this fact, since it is known that some persons are in a state of latent hypoparathyroidism I observed tetany in a young girl from whom I removed a nodular colloid goiter the size of a small egg located in the isthmus A simple enucleation was made Both lobes were left untouched since they were totally normal No ligation of the thyroid vessels was undertaken nor were the thyroid lobes dislocated since they were normal, thus I cannot see how I might have injured the parathyroids Yet on the first postoperative day the patient showed mild tetany which happily, disappeared in five or six days as a result of parathormone and calcium lactate therapy

The symptoms of postoperative tetany usually appear in the first twenty four hours after thyroidectomy and are characterized at first by a pricking sensation and slight stiffness of the fingers The symptoms usually reach their maximum on the third day and are always bilateral Exceptionally tetany may occur six eight ten or fifteen days after the operation

When fully developed the disease is characterized by tonic and intermittent spasmodic contractions in the flexor muscles of the upper extremities Such contractions are also present but in a lesser degree in the lower extremities At first these contractions occur at fairly long intervals but gradually they become more frequent and more intense Under severe conditions the contractions may last one or two hours and the musculature of the back the masseter muscles and the diaphragm may become involved Of course not all cases of tetany present the same picture or the same severity, in most of them however the condition is mild with only *tetanoid* symptoms

In addition to the muscular contractions four other cardinal signs apply to tetany

(1) the Chvostek sign, (2) the Weiss sign, (3) the Trousseau sign and (4) the Erb sign

In cases of severe tetany death is usually caused by spasm of the glottis the diaphragm and of the bronchi

Laboratory Observations — Characteristic data in cases of tetany are

1 In the blood hypocalcemia, hyperphosphatemia

2 In the urine low calcium, low phosphorus

As a rule, when the blood calcium falls below 7 mgm. per hundred cubic centimeters, symptoms of tetany appear. With values below 6.5 mgs. per hundred cubic centimeters the symptoms of tetany are severe.

Treatment.—The actual treatment of acute tetany consists in giving calcium and parathormone. The most useful form of calcium is calcium lactate in a 10 per cent solution, 1 to 2 tablespoonfuls three or four times a day. To be of any value it must be well dissolved. In an emulsion its effect is much reduced. Ordinarily, calcium lactate is well tolerated; however, if it produces diarrhea, it can be replaced by calcium carbonate, which is also well tolerated.

In the presence of acute tetany, intravenous injections of 10 per cent calcium chloride in doses of 10 cc. are indicated. Also, in an emergency, 5 mg. of calcium lactate in physiologic solution of sodium chloride can be given intravenously with good effect.

It must be borne in mind that a high phosphorus intake may prevent the calcium from relieving tetany, because the calcium combines with the phosphorus and forms an insoluble calcium phosphate, which will be eliminated through the urine and feces. Thus the calcium therapy is defeated in its purpose. It must be remembered also that a milk diet in such cases may neutralize the calcium because of the high phosphorus content of the milk.

Parathormone is given subcutaneously in dosage of 10 units two or three times a day. The injections of parathormone do not act immediately. There is a latent period of three to five hours, after which the blood calcium level rises.

Prolonged treatment with parathormone induces a state of accoutumancy, which in turn will produce a refractory state.

For conditions of long standing the parathormone should be accompanied with calcium lactate and thyroid extract.

Vitamin D given by mouth produces the same effect as does parathormone except that its physiologic action is delayed. Viosterol in large quantities stimulates the intestines to greater absorption of calcium. Ten drops a day is the usual dose. Cod liver oil is distinctly helpful.

Grafting of Parathyroids.—At operation, when the surgeon realizes that he has accidentally removed one or more parathyroids, these glands should be retransplanted at once. According to the studies and conclusions of the great Serge Voronoff, the natural site of the graft is in the posterior region of the thyroid. Voronoff has shown that a testicular transplant will "take" permanently only if it is grafted within the scrotum. In his opinion, the chemistry and temperature of the surrounding structures play a decisive part in the success of a graft.

A little niche is made with the end of a hemostat in the region of the posterior capsule; the parathyroid is then inserted in the little aperture and the opening is closed. Hemostasis must be secured before transplanting.

For chronic conditions in which parathyroid grafting is indicated, one must resort to heterotransplants. In such cases the parathyroid tissue should be cut into small pieces so as to enable nutrition to take place by osmosis before the transplant has a chance to die. This will give the transplant the opportunity to develop vascular connection with the surrounding structures and thus become permanently viable.

One of the fundamental desiderata for success of a heterotransplant is to have the patient in a well defined state of hypoparathyroidism; otherwise, the transplants will have little chance. The same principle holds true for thyroid transplantation.

HYPERTHYROIDISM ; HYPERPARATHYROIDISM

The thyroid and the parathyroids seem to activate each other. In the presence of thyrotoxicosis the parathyroids are spurred to overfunction, thus inducing skeletal decalcification and nonspecific arthritis. The osseous decalcification may be so intense as to allow spontaneous fractures to take place; a patient of mine broke her femur while turning in her bed. In cases of hyperthyroidism painful muscular and joint complaints are not at all uncommon. In few instances the picture assumes a more severe aspect, namely that of nonspecific arthritis. If the arthritis is located in the knee, flexion of the leg becomes more and more marked until it is complete, as I have observed in 2 instances.

In 21 cases of thyrotoxic goiter in which I endeavored to determine calcium elimination through the blood and urine the results were as follows

1 Hypercalcemia was present in 40 6 per cent of the cases

2 Hypophosphatemia was present in 40 per cent

3 Urine calcium was increased in 48 per cent

4 Urine phosphorus was below normal in 64 4 per cent and much above normal in 33 3 per cent of 16 cases investigated The same observations have been reported by others

One may conclude, then, that calcium elimination is increased in the presence of thyrotoxicosis The same clinical and laboratory results are obtained experimentally with *parathormone,* which corroborates the foregoing conclusion

Since it seems unquestionable that the toxic thyroid induces hyperparathyroidism and its consequences it follows that the only treatment for those disorders is prompt *thyroidectomy* Indeed, after the operation the calcium elimination stops the symptoms of nonspecific arthritis disappear, and recalcification of the skeleton takes place

EMBOLISM AND EMBOLECTOMY

Venous embolism is rare In 11 662 operations on the thyroid, I encountered it 3 times

Arterial embolism occurred 11 times in 11 662 operations an incidence of 1 per 1 000

Arterial embolism may occur before thyroidectomy or after thyroidectomy Before thyroidectomy it occurred 3 times once in a man and twice in the same woman The man had an arterial embolism in the right popliteal artery Amputation was necessary The patient died a few months later of thyrotoxicosis No thyroidectomy was performed

The woman had a very large toxic nodular goiter Congestive heart failure with ascites was present, this was controlled medically On the day before thyroidectomy an embolism occurred in the right axillary artery Embolectomy was performed three hours later The arm was saved Twenty four hours later another embolism formed this time in the right femoral artery Embolectomy was performed three hours later The leg was saved A few weeks later thyroidectomy was performed, the patient, unfortunately, died in thyroid crisis

After thyroidectomy, in 11 662 thyroid operations, arterial embolism occurred 8 times once at the aortic bifurcation, producing gangrene of both legs, 3 times in the right femoral artery, 3 times in the right popliteal artery and once at the posterior tibial artery on the right side One embolism was in a man, all the rest were in women

One embolism was associated with a nontoxic nodular goiter in a woman 27 years old with a clinically sound heart Embolism in the right femoral artery occurred on the twelfth day after the operation, when the patient was dressed and ready to leave the hospital Gangrene followed, and amputation above the knee was performed The patient was still living twenty years later

All the other embolisms occurred in cases of severely thyrotoxic goiter with cardiac disturbances

It is worthy of note that all these embolisms except the one in the aorta, whether they occurred before or after thyroidectomy, were observed on the *right side* In the 8 cases, embolectomy was done 3 times

Clinical Picture —The three pathognomonic signs of arterial embolism are (1) excruciating pain in the limb involved, (2) blanching of the extremity affected, and (3) exquisite pain on touching

Treatment —As soon as these three signs are noticed embolectomy must be performed at once (within the two to three hours after the accident), otherwise a long thrombus will form below the embolus, and when the blood circulation is restored the thrombus will be pushed downward so as to block the secondary arteries, thus producing obstruction and finally gangrene

Embolectomy is a useful operation done at the proper time and with skillful technic it may save a limb and perhaps a life

The Pavaex apparatus designed by Mont Reid and Herman is intended to produce an arterial collateral circulation and thus prevent gangrene Its use is particularly indicated when one wishes to activate and establish the circulation in the small arteries of the distant extremities It also serves well after embolectomy

AIR EMBOLISM

It is not particularly uncommon to observe bubbles of air moving up and down in the superficial veins of the neck during thyroidectomy. They are of no consequence. They are due to air sucked in through injuries to the superficial veins of the neck during operation. In all my experience I have never known any complications to follow these fractional air embolisms. I have never heard the "churning" of the air in the right ventricle, as one hears it in experimental animals.

KELOID

Keloid is a thickening of the operative scar. Instead of healing into a fine, almost invisible line, the incision heals with a thickened, raised red ridge. The thickening may occasionally become quite marked. It can be very painful also. I have seen a keloid as large as a thumb and as painful as a boil.

In the course of many months the keloid loses its angry look; it begins to shrink, and in the course of two or three years the whole ridge flattens down, assuming finally the appearance of a wide, flat, irregularly surfaced scar.

If, for cosmetic reasons, one is induced to remove the scar in the hope of creating a fine-looking new scar, the new incision will heal with the formation of new and *thicker* keloid.

The only treatment is roentgen or radium therapy over the line of incision alone. Radium is preferable. If the surgeon discovers other keloid formations on the body of the patient, the prophylactic application of radium eight to ten days after thyroidectomy may prevent keloid formation, or, at least, reduce it materially.

The cause of the keloid is not known. Its incidence is sometimes inconsistent; it may appear in the same patient after a thyroidectomy and not after an abdominal operation, or vice versa. I am of the opinion that a "beveled" incision and an inexact approximation of the skin flaps in closing leads to keloid formation.

Keloid appears mostly in young persons, especially women; it is not frequent in elderly persons. It is quite frequent among Negroes.

POSTOPERATIVE IMPLANTS

During thyroidectomy one must be careful not to leave in the wound some bit of thyroid tissue, because it will act as a thyroid graft and develop into a sizable thyroid tumor. The conditions for these autotransplants to "take" are ideal.

In dealing with a malignant goiter of the papillary type greater care than ever must be used, since those tumors are most apt to produce live implants.

ACCIDENTAL INJURY TO THE TRACHEA

Accidental injuries to the trachea during thyroidectomy occurred 6 times in this series. They usually occur while one is separating the isthmus from the trachea. The surgeon becomes aware of the accident by the whistling sound produced by the air going in and out of the trachea. This injury is of little importance. A stitch or two will close the gap.

Infection of the wound occurred in 1 instance. No fatality was observed, and there were no unpleasant distant results.

STERNOTOMY

I have not yet encountered an intrathoracic goiter of such size that I could not deliver it without enlarging the superior opening of the chest; in my experience sternotomy has never been necessary. To be sure, many were very large goiters and offered great technical difficulties; so far, however, I have always been able to deliver the goiter without injury to any of the important structures of the mediastinum or of the neck.

The fundamental principle is to proceed with care, *constantly remaining within the proper plane of cleavage.*

RECURRENCE

Recurrence depends upon the amount of thyroid removed. If the operation is radical, the incidence of recurrence is low; if not, it is high. Recurrence also depends upon the pathologic nature of the gland; if it is of the diffuse parenchymatous type, the recurrence rate will be low; if it is of the colloid type, and especially of the diffuse granular colloid type (tiny nodules), the rate will be much higher.

A lower incidence of recurrence may be expected if one takes the trouble always to dislocate completely the thyroid lobes forward and inward so as to visualize exactly the extent of the involvement. In this way the risk

TABLE 15 —*Recurrences*

Total number of recurrences	200		
Original operation performed elsewhere	129		
Operation performed by author	71		
Recurrence incidence in author's cases	0 6%		
Diffuse parenchymatous goiter	27	Toxic	27
Nodular colloid goiter	37	Toxic	30
		Nontoxic	7
Diffuse colloid goiter	7	Toxic	4
		Nontoxic	3

of leaving a posterointernal hyperplastic portion of the gland or a nodular goiter is avoided Also, if one does not ligate the trunk of the inferior thyroid artery extrafascially or otherwise, but only its branches when they cross the operative path, the chances for relapses are reduced, because compensatory hyperplasia of the remnant of resected lobe is less apt to occur

ANTITHYROID DRUGS

All antithyroid drugs ar more or less dangerous unless supervised by a physician who knows how to use them and unless the patient has easy access to laboratory facilities for follow up examination and frequent hematologic checkups If these requirements cannot be made available, antithyroid drugs should not be used

Lugol's Solution The most inoffensive of all antithyroid drugs is Lugol's solution No need to discuss it, it is too well known It is one of the greatest assets in combating thyroid diseases

Thiouracil and Its Derivatives These produce hyperplasia of the thyroid cells, disappearance of the colloid in the alveoli, and increase of the vascular supply of the gland, hence the increased size of the goiter In the pituitary, the acidophils are diminished and the basophils increased The adrenal cortex undergoes atrophy The plasma proteins change their ratio, the beta globulin increases In human beings thiouracil concentrates in the thyroid, the pituitary, the bone marrow, the adrenals and the ovaries

It has been shown experimentally that the concentration of thiouracil is half and half in the fetus and in the mother At birth the child has a hyperplastic thyroid and frequently shows retarded development Nothing is known about the distant results and influence of thiouracil upon the rest of the endocrines

Are these substances carcinogenic? It seems that with *combined administration* of allyl thiourea and the carcinogen 2 acetyl amino fluorin, benign and malignant tumors of the thyroid have been produced The separate use of these two chemicals apparently does not give rise to these thyroid tumors

If a patient treated with thiouracil for toxic nodular colloid goiter happens to harbor a carcinogen in his organism, it is thought that a malignant tumor of the thyroid may occur In all probability this danger is not to be feared if the thiouracil is used for only a few weeks as a preoperative medication If, however use of the drug is prolonged the possibility of this complication should be borne in mind and that particular form of antithyroid medication discarded One should not forget that after long and continued use of thiouracil the thyroid cells become more hyperplastic and show an undue number of mitoses as is observed in cancerous cells This extensive and active cellular activity is observed not only in experimental animals but in human beings It has been observed that not only adenomatous formation but malignant tumors of the thyroid may occur

These drugs do not cure thyrotoxic goiter, although they relieve the hyperthyroid symptoms On the contrary, the goiter becomes larger and more vascular, thus interfering with the surgical procedure

Since the goiter itself is not cured, it stands to reason that when the treatment is discontinued thyrotoxic relapses are bound to occur frequently And they do

In consequence, in view of the carcinogenic potentialities of the thiouracil derivatives, it is deemed wise to refrain from submitting patients to prolonged treatment with these drugs However, it would seem perfectly safe to use them for a few weeks, as a preparatory measure for thyroidectomy

Agranulocytosis is a dangerous complication of thiouracil medication Although propylthiouracil is less toxic, it nevertheless induces agranulocytosis, although in a much lesser proportion hence the [illegible] for frequent (weekly) laboratory blood tests to detect the incipient development of this complication. Leukopenia is a sign of impending agranulocytosis. As soon as this is observed, the antithyroid must be stopped. Penicillin (500,000 units) in divided doses is given daily. Blood transfusions are essential if agranulocytosis is already well established. All medicaments that depress the bone-marrow, such as aspirin and coal tar derivatives, must be avoided. On the other hand, medicaments that do activate the bone marrow and the blood-producing organs (liver extract, pentnucleotide, folic acid), must be generously used.

Radioactive Iodine: Radioactive Iodine is, in the last analysis, an *internal roentgen treatment;* its beta and gamma rays do not differ in any way from those of external roentgen irradiation; both destroy tissue and produce fibrosis. Irradiation from radioactive iodine takes place anywhere it happens to locate, thus endangering the endocrines in the immediate as well as in the distant future, whereas external irradiation can be controlled and localized.

One must not forget that the I^{131} irradiation is far more potent than is irradiation from external application.

Experimentally it has been shown that radioactive iodine in large concentrations destroys the whole thyroid gland of the rat in about three weeks; the organ is converted into a mass of connective tissue. Oddly enough, the parathyroids within that mass of fibrosis seem to remain unaffected. The pituitary is markedly affected and gives rise later to large chromophobe tumors. The bone marrow, ovaries and adrenals show pathologic change (Aubrey Gorbman). At the present, therefore, the status of radioactive iodine as the treatment of thyrotoxicosis remains in abeyance and must remain so until its dosage and its distant effects are better known. Given in too large doses it produces myxedema; in too little quantities, the results are insufficient and the condition may recur. As yet the correct dosage is unknown.

This preparation, nevertheless, proves very useful in cases in which operation is dangerous; e.g., when there are severe congestive failure, multiple recurrence and mental aberrations. For metastatic thyroid cancer, radioactive iodine promises great help, first in locating the metastases and then in their treatment. Here one need not be unduly concerned about some of the harmful results; the pressing need is to control these metastases and arrest their growth. Cure is still out of the question, but beneficial results can be obtained.

SUMMARY

The author's statistics and conclusions are based upon 11,662 thyroid operations. Terminology is discussed; it is pointed out that thyrotoxic diffuse parenchymatous goiter and toxic adenoma are not two different diseases; they are one. The hyperthyroid syndrome is called thyrotoxicosis.

Ligations are no longer performed, having been replaced by newer methods of treatment.

The death rate of thyroidectomy for nonmalignant goiter is discussed, together with ways of reducing it. Anesthesia and the one-stage operation are emphasized. The nature and treatment of thyroid crisis and a "line of conduct" in the treatment of thyrotoxicosis are important points.

Exophthalmos is discussed at some length. Contrary to popular belief, it occurs in cases of thyrotoxic nodular goiter. Its cause is still unknown. Its mechanical aspect is better understood. The clinical picture and the treatment of exophthalmos are presented.

The incidence of malignant diseases of the thyroid is computed and its pathologic picture outlined. Its death rate is presented and its treatment discussed, with special reference to the significance of the solitary nodule.

Hürthle cell tumors and their incidence are discussed.

Aberrant goiter, a rare condition, is discussed with regard to its embryonic origin, its significance and its malignant potentialities.

Acute and subacute thyroiditis are discussed. It is pointed out that syphilis and tuberculosis of the thyroid are exceedingly rare. The causes, differential diagnosis and treatment of chronic thyroiditis, Riedel's struma and Hashimoto's disease are discussed.

Thyrotoxicosis in pregnancy should be treated medically, if at all possible and safe. It is better to wait until after delivery before operating unless intervention is imperative.

No thiouracil and no radioactive iodine should be used

Cases of mental disease are not infrequently complicated by thyrotoxicosis Thyroidectomy in such instances is beneficial but not curative In cases of thyrotoxic insanity, however cure is complete

A low basal metabolic rate exists in connection with thyrotoxicosis True basal metabolism, "hospital metabolism" and 'office metabolism" are discussed It is shown that hypermetabolism and hypometabolism are not synonymous with hyperthyroidism and hypothyroidism

Thyroidectomy for children and adolescents is discussed Surgical intervention is indicated for nodular goiters only The diffuse parenchymatous toxic type is treated medically with Lugol's solution, and by external irradiation No thiouracil nor radioactive iodine is given

The anatomic relations of the laryngeal nerves and the results of laryngeal nerve injuries are discussed Routine exposure of the laryngeal nerve is considered King's operation is advocated, if this is not available a valved tracheotomy tube is very useful

Parathyroids accidentally removed at operation must be at once retransplanted into the posterior aspect of the thyroid Tetany and its treatment are discussed as are heterotransplants

In the presence of thyrotoxicosis the parathyroids are spurred to overactivity in about 50 per cent of cases, as shown by blood and urine calcium studies thus inducing decalcification of the skeleton and nonspecific arthritis Thyroidectomy relieves the condition completely

Venous embolism complicating thyroidectomy is rare Arterial embolism has been observed several times, always on the right side, never the left The symptoms are described Embolectomy must be done within two to three hours The Pavaex apparatus is recommended

Air embolism is discussed

Keloid formations sometimes occur after thyroidectomy It is mandatory to avoid a beveled incision and to approximate the skin flaps exactly Radium should be applied

One must guard against leaving bits of thyroid tissue in the wound lest they act as 'grafts

Accidental injuries to the trachea during thyroidectomy are of no consequence. A stitch or two is all that is necessary Sulfathiazole should be used

Sternotomy has never been found necessary to remove an intrathoracic goiter Requirement Remain in the proper plane of cleavage

Recurrences and their incidence are discussed

Antithyroid medication is discussed Lugol's solution is the most innocuous of all Thiouracil controls hyperthyroid symptoms but does not cure the goiter which grows larger The carcinogenic potentialities of thiouracil are presented Radioactive iodine holds great promise but is not yet safe It is a great help in treating patients who cannot be operated upon with safety

RÉSUMÉ

La statistique et les conclusions de cet auteur sont fondées sur 11 662 opérations sur la glande thyroide La terminologie en est discutee On souligne le fait que le goître parenchymateux thyrotoxique diffus et l'adénome toxique ne sont pas deux maladies différentes mais n'en forment qu'une Le syndrome hyperthyroïdien est appelé thyrotoxicose

La ligature n'est plus en faveur mais a été remplacee par de nouvelles méthodes de traitement

La mortalité suivant la thyroïdectomie pour goître non malin est discutée aussi bien que les moyens de la diminuer Le mode d'anesthésie et l'opération en un seul temps sont recommandes La nature et le traitement de la crise thyroïdienne et la méthode de traitement de la thyrotoxicose sont des facteurs importants Le sujet de l'exophthalmie est étudié En dépit de l'opinion prévalente l'exophthalmie est présente dans des cas de goître thyrotoxique nodulaire Sa cause est inconnue Ses aspects mécaniques sont mieux compris Le tableau clinique et le traitement de l'exophthalmie sont présentés

Le pourcentage de malignité de la glande thyroide est calculé, le tableau pathologique esquissé Le taux de mortalité et le traitement sont discutés soulignant la signification du nodule unique

Les tumeurs à cellule de Hurthle et leur pourcentage sont exposées.

Le goître aberrant, affection rare, est mentionné, l'auteur prenant en considération son origine embryonnaire, sa signification et ses possibilités de malignité.

La thyroïdite aigüe et subaigüe sont citées. L'on démontre que la syphilis et la tuberculose de la thyroïde sont extrêmement rares. Les causes, le diagnostic différentiel et le traitement de la thyroïdite, du struma de Riedel et la maladie de Hashimoto sont étudiées.

La thyrotoxicose de la grossesse devrait être traitée par une thérapeutique médicale si cela est possible. Si l'on peut, mieux vaut attendre que l'accouchement ait eu lieu avant d'opérer. On ne devra pas employer le thiouracil et l'iode radioactif.

Les cas de maladies mentales sont assez fréquemment compliqués par la thyrotoxicose. La thyroïdectomie dans ces cas, améliore mais n'apporte pas la guérison. Dans les cas de folie thyrotoxique, cependant, la guérison est complète.

Un faible débit métabolique se rattache à la thyrotoxicose. Un taux métabolique de base réel, "le métabolisme d'hôpital et le métabolisme d'office médical" ne sont pas synonymes de l'hyperthyroïdisme et de l'hypothyroïdisme.

L'auteur commente la thyroïdectomie pour les enfants et les adolescents. L'opération n'est indiquée que pour les goîtres nodulaires. Le type toxique parenchymateux diffus reçoit le traitement clinique à solution de Lugol et irradiation externe. Ni le thiouracil ni l'iode radioactif ne sont employés.

Les rapports anatomiques des nerfs du larynx et les résultats des lésions accidentelles de ce nerf sont étudiés. L'on considère la valeur de la découverte systématique du nerf laryngien. L'opération de King est préconisée. Si elle ne peut se faire, il est bon d'employer un tube de trachéotomie à valve.

Les parathyroïdes emportées accidentellement à l'opération doivent être immédiatement transplantées à la surface postérieure de la thyroïde. Le tétanos et son traitement ainsi que l'hétérotransplantation, sont discutés.

Lorsque la thyrotoxicose existe, l'activité des glandes parathyroïdes, comme le démontrent les études sur le calcium du sang et de l'urine, est stimulée dans environ la moitié des cas, ce qui conduit à la décalcification du squelette et à l'arthrite non spécifique. La thyroïdectomie guérit complètement cette condition.

L'embolie veineuse comme complication de la thyroïdectomie est rare. On a observé plusieurs fois l'embolie artérielle toujours du côté droit. Description de l'embolie. L'embolectomie doit être exécutée dans les deux ou trois heures qui suivent. On recommande l'emploi de l'appareil Paevex.

L'auteur discute la question de l'embolisme gazeux.

Des formations kéloïdes se produisent parfois après la thyroïdectomie, l'incision en biseau doit être évitée et les lambeaux cutanés doivent être parfaitement alignés. Se servir du radium.

Le chirurgien évitera soigneusement que des fragments de la thyroide ne soient pris dans la plaie de façon à ce qu'ils ne fassent pas fonction de greffons.

Les blessures faites accidentellement à la trachée durant l'intervention sont sans importance. Une suture ou deux sont suffisantes à les réparer. L'emploi du sulfathiazol est nécessaire.

On ne doit jamais faire une sternotomie pour l'ablation du goître intrathoracique. Faire très attention è rester dans le plan de clivage.

Les récidives et leur taux sont mentionnés.

L'auteur cite les médicaments antithyroïdes. Parmi ceux ci, la solution de Lugol est la moins nocive. Le thiouracil contrôle les symptomes hyperthyroïdiens mais ne guérit pas le goître qui continue à grossir. Les tendances carcinogéniques du thiouracil sont notées. L'iode radioactif offre de belles promesses mais son emploi n'est pas encore sans danger. C'est un auxiliaire important pour le traitement des malades qui ne peuvent subir l'intervention opératoire.

RIASSUNTO

La statistica e le conclusioni si basano sopra 11.662 operazioni sulla tiroide. Discute la terminologia: per quanto riguarda il gozzo parenchimatoso tireotossico e l'adenoma tossico, questi non rappresentano una diversa entita' morbosa, ma una sola. La sindrome ipertiroidea e' chiamata tireotossicosi.

La legatura dellé arterie non viene piu' ese-

guita e' stata sostituita da altri metodi operativi

Analizza la percentuale di mortalita' da tiroidectomia per gozzi non maligni discutendo i mezzi per ridurla Notevole importanza viene attribuita alla natura ed alla cura delle crisi tiroidee ed alla linea di condotta nel trattamento delle tireotossicosi Considera diffusamente l'esoftalmo la cui etiologica e ancora ignota Contrariamente alle vedute comuni l'esoftalmo e' presente anche nel gozzo nodulare tireotossico Descrive infine l'aspetto clinico e la cura dell'esoftalmo

Riporta la percentuale di malignita dei tumore tiroidei, illustrandone gli aspetti patologici e discutendone la cura Un speciale significato viene attribuito ai noduli solitari Discute la frequenza dei tumori a cellule di Hurthle

Ricorda i gozzi aberranti di cui esamina l' origine embrionaria, la frequenza e la tendenza oncogenetica

Analizza le tiroiditi acute e croniche in riguardo all'etiologia, la diagnosi differenzale e la cura Nell'analisi vengono comprese la sifilide, la tubercolosi (ambedue molto rare) lo struma di Riedel ed il morbo di Hashimoto

Le tireotossicosi in gravidanza dovrebbero essere sottoposte a cure mediche, escludendo pero' il tiouracile e l'iodio radioattivo La cura operativa dovrebbe essere procrastinata se possibile, a dopo il parto

Ricorda come le malattie mentali siano spesso complicate da tireotossicosi La tiroidectomia riuscirebbe in questi casi utile, ma non sarebbe effettivamente curativa Una guarigione completa avverrebbe invece nei casi di psicosi tireotossiche

Sottolinea la circostanza che un ricambio basale basso puo' esistere con una tireotossicosi Il metabolismo vero, il "metabolismo d'ospedale," ed il "metabolismo d'ufficio' non sono sinonimi con l'iper o l'ipotiroidismo

Discute la tiroidectomia nei bambini e negli adolescenti L'operazione sarebbe indicata solamente nei gozzi nodulari Nel tipo parenchimatoso cronico la cura sarebbe medicamentosa, con soluzione di Lugol e con irradiazioni esterne Il tiouracile e l'iodio radioattivo sarebbero esclusi

Riepiloga i rapporti anatomici dei nervi laringei e ne descrive le possibili lesioni Consiglia un'esposizione sistematica di questi nervi Si dichiara a favore dell'operazione di King se questa non e' possibile, un tubo da tracheotomia a valve sarebbe indicato

Se durante un'operazione le paratiroidi vengono accidentalmente asportate, queste vanno immediatamente ritrapiantate sulla faccia posteriore della tiroide La tetania paratireopriva viene illustrata nella cura viene compreso l'eterotrapianto

La funzione delle paratiroidi sarebbe esaltata nel 30% circa dei casi di tireotossicosi come sarebbe dimostrato dalle determinazioni del calcio nelle urine e nel sangue nonche' dai fenomeni di decalcificazione delle ossa e da artriti non specifiche La tiroidectomia eliminerebbe completamente questi fenomeni

Rare sarebbero le embolie venose da tiroidectomia Piu' frequenti le embolie arteriose, sempre del lato destro In questi casi un'embolectomia dovrebbe essere eseguita nelle prime 2 3 ore dopo l'operazione L'apparecchio di Paevex riuscirebbe utile Nella discussione viene compreso l'embolismo gassoso

Un breve riferimento viene fatto alle cicatrici cheloidee ricordando la necessita' di approssimare esattamente i lembi cutanei La radiumterapia troverebbe in questi casi un 'indicazione

Possibili lesioni alla trachea durante l'operazione non avrebbero effettiva importanza Sarebbero sufficienti alcuni punti di sutura Indicata la somministrazione di sulfatiazolo

L'A non ha mai dovuto ricorrere ad una sternotomia per l'asportazione di un gozzo toracico Basterebbe eseguire l'operazione nell'esatto piano di clivaggio

Per quanto riguarda le cure mediche antitiroidee, l'A ritiene che la soluzione di Lugol sia la piu' innoqua Il tiouracile controlla i sintomi di ipertiroidismo, ma non cura il gozzo che diviene piu' voluminoso Un accenno viene fatto alle possibili influenze carcinogeniche del tiouracile L'iodio radioattivo e' pieno di promesse, ma non e' privo di pericoli Puo' essere molto utile nel curare pazienti la cui prognosi operatoria e' troppo incerta

RESUMEN

Las estadísticas y conclusiones del autor están basadas en 11,622 intervenciones Al discutir la terminología de esta intervención

señala el autor que el bocio tirotóxico difuso parenquimatoso y el adenoma tóxico no son dos enfermedades diferentes sino una misma, denominándose tirotoxicosis al síndrome hipertiroideo.

No se continúa practicando la ligadura, habiéndola reemplazado por métodos más nuevos de tratamientos.

Se estudia el porcentaje de mortalidad causada por la tiroidectomía para tratar un bocio no maligno, junto con los medios de reducirlo. La anestesia y la operación en una sola fase, son también estudiadas. La naturaleza y tratamiento de la crisis tiroidea y la "línea de conducta" en el tratamiento de la tirotoxicosis son problemas de importancia.

Se examina ampliamente el problema del exoftalmos, que en contra de la creencia popular existe en los casos de bocio nodular tirotóxico, siendo su causa todavía desconocida, y conociéndose mejor su aspecto mecánico. Se presenta el cuadro clínico y el tratamiento del exoftalmos.

Se examina la frecuencia de los procesos malignos del tiroides y se esboza su cuadro anátomopatológico, el porcentaje de mortalidad y los métodos de tratamiento, refiriéndose especialmente al significado de los nódulos solitarios. Se examinan los tumores de células de Hurthle y su frecuencia. También se estudia el bocio aberrante, un proceso raro, con referencia a su origen embrionario, su significado y sus posibilidades de convertirse en un proceso maligno. Se pasa revista a la tiroiditis subaguda señalándose la rareza de la sífilis y tuberculosis del tiroides. Se estudian también las causas diagnósticas diferenciales y el tratamiento de la tiroiditis crónica, estruma de Riedel y enfermedad de Hashimoto.

La tirotoxicosis del embarazo debe tratarse medicamente si ello es posible y sin peligro, siendo mejor esperar hasta después del parto para operar si ello es posible. No debe emplearse tiouracilo ni yodo radioactivo. No es raro que los casos de trastornos mentales se compliquen con tirotixicosis. En tales casos, la tiroidectomia es beneficiosa, aunque no curativa. En los casos de psicosis tirotòxica, sin embargo, la curación es completa.

En presencia de la tirotoxicosis las paratiroides resultan estimuladas en un sentido de hiperactividad en un 50 por ciento de los casos, como lo demuestran los estudios del calcio en la sangre y la orina induciendo, por tanto, a una decalcificación del esquelto, y a una artritis no específica. La tiroidectomía alivia completamente este proceso.

Raramente se observa embolismo venoso complicante de la tiroidectomia, habiéndose observado embolismo arterial varias veces, siempre en el lado derecho. Se describen los síntomas. La embolectomía debe realizarse dentro de un plazo de dos a tres horas, recomendándose el aparato de Paevex.

Se estudia el embolismo gaseoso.

Después de la tiroidectomía se forman, a veces, formaciones queloides, siendo pruedente el evitar la incisión biselada y juntar exactamente los colgajos cutáneos, debiéndose aplicar radio.

El cirujano debe procurar no dejar fragmentos de tejido tiroideo en la herida, puesto que podrían actuar a modo de injertos.

Las lesiones accidentales de la tráquea durante la tiroidectomía no tienen importancia, necesitándose únicamente dar uno o dos puntos y debiéndose emplear también sulfatiazol.

La esternotomía no ha sido nunca necesaria para extirpar un bocio intratorácico. Se examinan las recaídas y su frecuencia.

El autor estudio también las medicaciones antitiroídeas. La solución de Lugol es la más innocua de todas. El tiouracilo domina los síntomas hipertiroides, pero no cura el bocio que aumenta de tamaño. Se presentan las propiedades carcinógenas del tiouracilo. El yodo radioactivo es más prometedor, pero es más peligroso, siendo un recurso de gran utilidad para tratar a los pacientes que no pueden operarse sin peligro.

Editor's Note: The following statistical additions and corrections for the first installment of Dr. Crotti's article, reached us too late for inclusion in the May issue: In the section on thyrotoxicosis, the incidence of exophthalmos in cases of toxic nodular and diffuse colloid goiter should be 5 per cent, not 0.5 per cent; in Table 1, the number of ligations is 523, and a line showing a total of 11,662 operations should be supplied. In the second footnote to the first part of Table 3, the total number of thyroidectomies for benign goiter should be 4,052.

Meckel's Diverticulum*

A Study of Fifty Cases

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MECKEL'S diverticulum represents the persistence of the intraabdominal portion of the omphalomesenteric duct which in early embryonic life connects the midgut with the yolk sac Classic reviews upon this entire subject have been presented and in the past five years there has been a renewal of interest

HISTORY

It is stated that Hildamus was the first to recognize this diverticulum in 1598 Kern said that Lavater first observed it in 1671 Ruysch in 1701, in Volume 7, Figure 283 of the *Thesaurus Anatomicus*, clearly illustrated this interesting congenital anomaly In 1738 Fabricius stated that this diverticulum was caused solely by mechanical pressure of the intestinal contents Meckel, in his "Darmanhang" at Leipzig in 1812, presented the first clear description of the fundamental anatomy and comprehensively reviewed the past literature on this diverticulum, which is today named in his honor Since Meckel's classic contribution nearly every eminent man associated with the improvement of surgical science has made his contribution to the vast sum of present day knowledge

INCIDENCE

Ewing set the incidence of Meckel's diverticulum at 2 7 per cent of the population Balfour observed postmortem occurrence in 10 600 autopsies to be 0 14 per cent Telling reported the necropsy incidence as 2 99 per cent Nygaard and Walters believed that this diverticulum is present in from 1 to 2 per cent of all human beings Curd in 40 439 autopsies recorded 0 9 per cent occurrence of Meckel's diverticulum

The surgical incidence has always been at great variance with the postmortem statistics Balfour encountered 15 such diverticula in 11 107 laporatomies Umphrey in 3 460 abdominal explorations found 9 examples of Meckel's diverticulum McGlannan reported only 3 instances in 14,000 abdominal operations Schwer and Jackson recently collected 39 cases observed at the Jackson Clinic since 1915, 7 examples were discovered during 1948 alone It is believed that, in the future, more of these congenital anomalous diverticula will be found in exactly the same ratio as the degree of diligent care is increased in performing an abdominal exploration Charles W Mayo aptly remarked "Meckel's diverticulum is frequently suspected, often looked for, and seldom found "

It is the plan of this presentation to review briefly the 50 proved examples of Meckel's diverticulum encountered by twenty three different surgeons at the Hollywood Presbyterian Hospital between 1924 and June 30, 1949, occurring in 206 277 consecutive hospital admissions and representing an incidence of 0 024 per cent This percentage figure is practically identical to that recorded in 15 cases at the Los Angeles County General Hospital for the nine year period beginning in April 1928 (0 022 per cent for 500,000 new patients admitted) The important data of this study have been summarized in nine tables emphasizing the interesting points These tables are self explanatory and require no elaboration

The sex incidence in this series is exactly opposite to that reported by most authors in the past (see Bibliography) Sixty-four per cent of the patients were female

The average age of this group of 50 patients was 35 2 years This age is more advanced than that recorded by Schwer and Jackson

The one carcinoid tumor encountered in this study has been previously reported in the literature Through the kind permission of the Editor of the *American Journal of Surgery*, Figs 2 throug ced here to illus-

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From the Department of Surgery Hollywood Presbyterian Hospital Los Angeles
Submitted for publication March 1 1950

trate the important pathologic-anatomic details.

Fig. 1 is a roentgenogram of the abdomen of a patient of Dr. E. Forrest Boyd of our

TABLE 1.—*Distribution of Cases By Year*

Year	Sex of patient		Total	Pathologic lesions	Deaths
	Male	Female			
1924-1935:	1	1	2	2	0
1936:	1	0	1	1	0
1937:	0	3	3	0	0
1938:	0	0	0	0	0
1939:	0	1	1	1	0
1940:	1	0	1	0	0
1941:	2	1	3	2	0
1942:	1	1	2	1	0
1943:	1	4	5	0	0
1944:	0	5	5	3	0
1945:	2	2	4	1	0
1946:	3	1	4	3	0
1947:	2	4	6	1	0
1948:	3	7	10	2	2
1949: (To 6/30)	1	2	3	1	1
Totals	18	32	50	18	3

TABLE 2.—*Methods of Diagnosis*

Method	No. of cases	Per cent of total
A. Surgical (correct preoperative diagnosis, 1 case)	46	92
B. Roentgenologic	2	4
C. Postmortem (incidental observation)	2	4
Totals	50	100

TABLE 3.—*Distribution of Cases per Surgeon*

Surgeon	Diagnoses	Total No. of cases	Per cent of total
1 surgeon	13	13	26
2 surgeons	4	8	16
2 surgeons	3	6	12
5 surgeons	2	10	20
13 surgeons	1	13	26
Total 23 surgeons		50	100

TABLE 4.—*Age and Sex Incidence*

Age in years	Sex		Total	Pathologic lesions	Deaths
	Male	Female			
0— 9	2	5	7	1	0
10—19	2	1	3	1	0
20—29	5	8	13	5	0
30—39	5	7	12	5	0
40—49	1	5	6	1	0
50—59	3	2	5	3	1
60—69	0	1	1	0	1
70—79	0	1	1	0	1
80—89	0	2	2	2	0
Total	18	32	50	18	3

Average age for entire series of 50	35.2 years
Average age of 18 male patients	32.9 years
Average age of 32 female patients	36.4 years
Average age in 18 instances of pathologic lesions	42.4 years
Age of youngest patient	5.0 years
Age of oldest patient	89.0 years
Average age of the remaining 48 patients	34.3 years

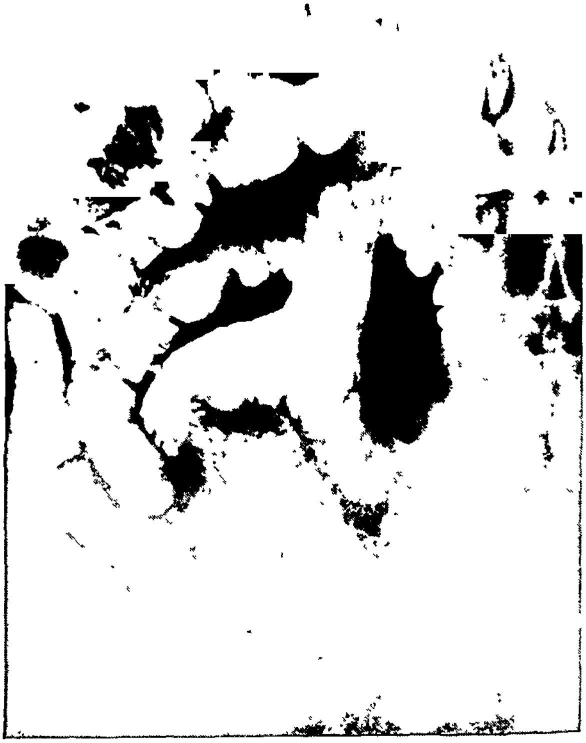

Fig. 1.—Case of Mrs. G. O., aged 59, 3/14/49. Roentgenogram clearly reveals a large Meckel's diverticulum, measuring 8 x 2 cm. and situated 20 cm. from ileocecal valve. (By permission of Dr. E. Forrest Boyd and Dr. William H. Brown.)

TABLE 5 —*Pathologic Classification of Meckel's Diverticula (After Greenblatt)*

Type	Sex of patient		Total cases	Per cent of total
	Male	Female		
I Incidental (without disease, one contained a toothpick)	11	21	32	64
II Inflammatory (9 cases or 18%)				
A Nonspecific				
1 Acute				
(A) Catarrhal	0	2	2	4
(B) Gangrenous and perforated	2	0	2	4
2 Subacute	2	2	4	8
3 Chronic	0	1	1	2
III Obstructive (6 cases or 12%)				
1 Torsion or volvulus	0	1	1	2
2 Bands remnants of omphaloenteric—duct or vessels	1	4	5	10
IV Peptic Ulceration (perforated)	1	0	1	2
V Tumors				
A Benign				
1 Carcinoid	1	0	1	2
B Malignant	0	0	0	0
C Heterotopic Tissue				
1 Gastric	0	1	1	2
Total	18	32	50	100

TABLE 6 —*Reason for Surgical Intervention for Normal Persons with Meckel's Diverticula*

Surgical—pathologic diagnosis		No of cases	Per cent of total
Appendicitis		18	36
A Acute	2		
B Subacute and chronic	9		
C "Chronic"	7		
Chronic salpingitis and "chronic" appendicitis		3	6
Intestinal obstruction from Postoperative adhesions		3	6
Adenocarcinoma of the rectosigmoid colon with metastases		2	4
Multiple uterine fibromyomas		2	4
Cesarean section		1	2
Torsion of mid ileum		1	2
Bilateral hydrosalpinx		1	2
Chronic myocarditis and generalized arteriosclerosis (postmortem diagnosis)		1	2
Total		32	64

attending staff, who graciously consented to its use in this report This is a classic picture of a large Meckel's diverticulum such as seldom obtained Dr William H Brown the hospital roentgenologist, kindly lent this roentgenogram from his extensive collection on diverticula of the small intestine

The 3 deaths in this group were not related to the Meckel's diverticula, which were merely incidental No deaths were directly attributable to the surgical removal of this anomaly This is a vast improvement over a 37 5 per cent mortality rate reported in 1937 for 11 instances of surgical excision of the diverticulum causing acute surgical abdominal disease

Two cases of gastric heterotopia were observed in 1 of which a typical perforated peptic ulcer had developed as a result

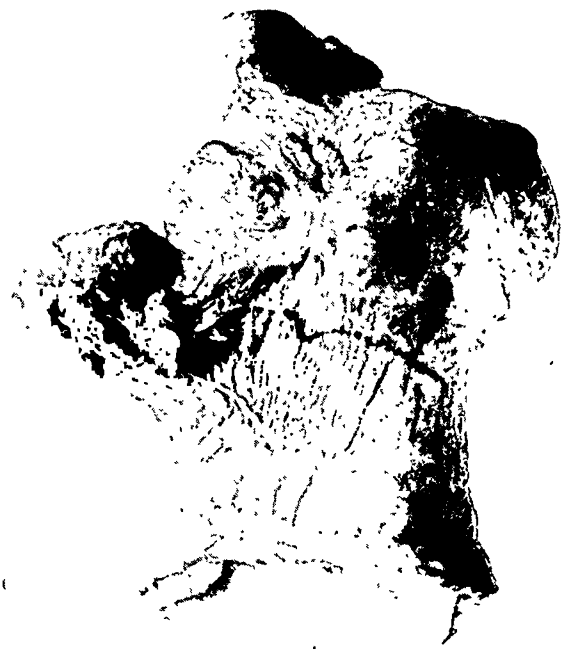

Fig. 2.—Case of Mr. W. R. A., aged 56, 9/30/36. Gross appearance of Meckel's diverticulum, showing three of the four smaller diverticula situated at the tip. Note puckered scarred area at base of middle secondary diverticulum. Photomicrographs taken through scarred. area Dimensions, 3. x 1.75 cm. (Author's case.)

Table 7.—*Distance of Meckel's Diverticula from Ileocecal Valve*

Distance, cm.	No. of cases	Per cent of total
Not stated	23	46
10—19	4	8
20—29	2	4
30—39	6	12
40—49	8	16
50—59	1	2
60—69	4	8
70—79	0	0
100	1	2
120	1	2
Total	50	100

Specimen closest to ileocecal valve	10 cm.
Specimen farthest from ileocecal valve	120 cm.
Average distance from ileocecal valve in 27 instances	42.2 cm.

Table 8.—*Dimensions of 40 Specimens (in Surgical—Pathologic Report*)*

Specimen	Dimensions, cm.
Average dimensions (in 38 instances)	2.79×2.61
Shortest	0.75
Longest	12.00
Narrowest	1.00
Widest	8.00

*These dimensions are subject to about 25% shrinkage from actual measurements before excision.

In 8 patients of this series the diverticulum was *not* excised. All survived the immediate operation, 1 dying later from metastatic adenocarcinoma originating in the rectosigmoid. In 2 cases the diagnosis was made by roentgenologic study and in 2 more at the autopsy table.

Interesting case reports on various pathologic features of Meckel's diverticulum have been presented recently and are recommended to the reader for further study upon this fascinating subject (see Bibliography). Dr. Max Thorek has admirably summed up the salient technical features in his *Modern Surgical Technic.*

SUMMARY

Fifty proved cases of Meckel's diverticulum, including 1 case of carcinoid tumor and 2 of heterotopia of gastric tissue, are presented and analyzed. All were taken from the records of the Hollywood Presbyterian Hospital between 1924 and June 30, 1949. The diverticula occurred in 206,277 consecutive admissions, an incidence of 0.024 per cent. The average age of the patients was 35.2 years. Sixty-four per cent were female, in sharp contrast to previously reported studies citing male predominance. Thirty-six per cent of the 50 operative specimens showed important pathologic abnormalities. No deaths were attributable to surgical excision of the 35 diverticula. Three deaths occurred from totally unrelated causes.

A plea is made for more careful examination of the distal 120 cm. of the terminal ileum during the performance of an exploratory laporatomy. When this diverticulum is found it should be prophylactically removed if possible.

RÉSUMÉ

Cinquante cas prouvés de diverticule de Meckel, comprenant 1 cas de tumeur carcinomateuse et deux d'hétéropie de tissu gas-

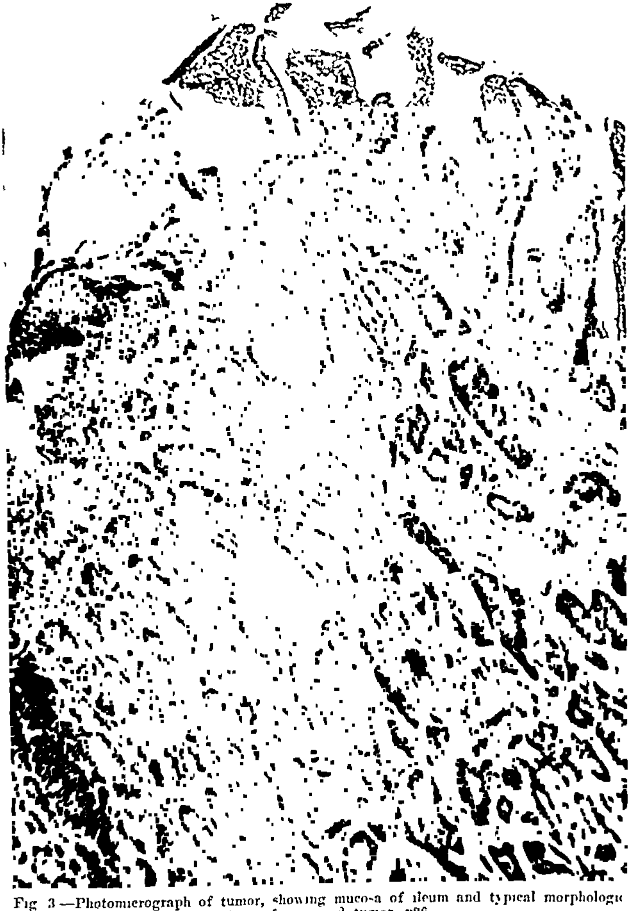

Fig 3—Photomicrograph of tumor, showing mucosa of ileum and typical morphologic picture of carcinoid tumor ×26

trique, sont présentés et analysés Ils furent tous prélevés dans les archives du Hollywood Presbyterian Hospital entre 1924 et le 30 juin 1949 Les diverticules se produisirent parmi les 206 277 admissions consécutives, soit au taux de 0,024 pour cent L'âge moyen malades était 35 ans et demi. Soixante-quatre pour cent se produisirent chez la femme, en contraste frappant avec les études publiées jusqu'ici, citant la pré omin [illegible] mâle des [illegible]alade [illegible] des pi [illegible] lémon- [illegible]ren [illegible] tantes [illegible] ues

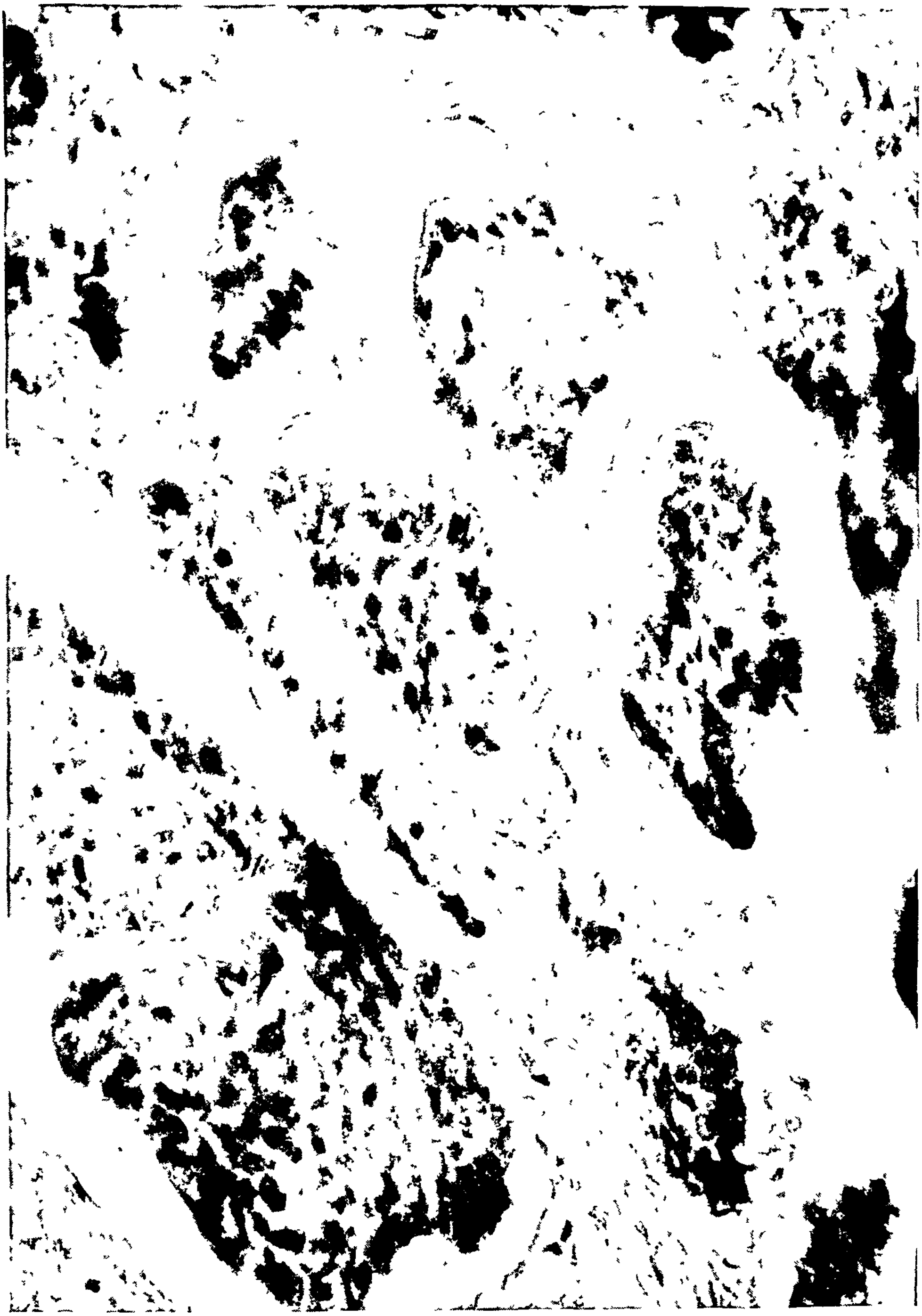

Fig. 4.—Photomicrograph showing cytologic details, clearly demonstrating characteristic appearance of carcinoid tumor. x120.

La mortalité qui peut être attribuée à l'excision des 35 diverticules est nulle, Trois morts se produisirent, causées par des facteurs sans relation aucune avec les diverticules.

L'auteur plaide la cause de l'examen plus minutieux des 120 cms. distaux de l'iléon terminal durant toute laparatomie exploratrice. Lorsque le diverticulum existe, et si ceci est faisable, il devrait être excisé a titre prophylactique.

TABLE 9—*Treatment*

Type of case	No. of cases	Per cent of total	Grand total
I Surgical			
A Excision			
1 Two-row suture inversion of stump	35	70	
2 Stump ligated and cauterized by phenol followed by alcohol	1	2	
3 Same as 2 plus purse-string inversion of stump	1	2	
4 Resected with 10 cm. of gangrenous ileum	1	2	
			38—76%
B Nonexcision			
1 Invaginated into ileum	3	6	
2 Appendectomy only (chronic Appendicitis in both	2	4	
3 Etiologic agent for volvulus which was reduced	1	2	
4 Inoperable metastatic adenocarcinoma	1	2	
5 Fibrous band from tip of Meckel's diverticulum to the right ovary cut	1	2	
			46—92%
II. Nonsurgical, diagnosis only			
A. By roentgenologic study	2	4	
B By postmortem examination	2	4	
			50—100%

RESUMEN

Se presentan y analizan cincuenta casos comprobados de divertículo de Meckel incluyendo un caso de tumor carcinoide y dos de heterotopia de los tejidos gástricos. Todos los casos se toman de los archivos del Hospital Presbiteriano Hollywood entre 1924 y el 30 de Junio de 1949. Los divertículos se presentaron en 206 277 ingresos consecutivos lo que representa una frecuencia de 0.024 por ciento. El promedio de edad de los pacientes fue de 35.2 años. Sesenta y cuatro por ciento eran del sexo femenino en marcado contraste con los estudios previamente citados en los que se señala la predominancia masculina. El 36 por ciento de los casos operatorios presentaron importantes anormalidades patológicas. No existieron casos de muerte atribuidos a la reacción quirúrgica de 35 divertículos acaeciendo 3 muertes por causas diferentes y no relacionadas.

El autor insiste que se realice un examen más cuidadoso de los 120 cm. del íleo terminal al practicar la laparotomía exploratoria. En cuanto se hallen estos divertículos deben extirparse profilácticamente si ello fuera posible.

RIASSUNTO

Descrive ed analizza 50 casi di diverticoli di Meckel comprendenti 1 tumore carcinoide e 2 eterotopie di tessuto gastrico. Questi casi sono occorsi nell'Ospedale Presbiteriano di Hollywood dal 1924 al 30 giugno 1949. La percentuale di frequenza—in rapporto a 206 277 consecutive ammissioni—e' del 0.024%. L'eta' media dei pazienti e' di 35.2 anni. A differenza di quanto era stato segnalato in precedenza da altri AA. la percentuale e' piu' elevata nel sesso femminile (64%). Nel 36% dei casi operati esistevano importanti anomalie patologiche. Nessun caso di morte attribuibile all'operazione. In tre casi l'esito letale viene attribuibito ad altre cause.

L'A. raccomanda di esaminare accuratamente i 120 cm. della porzione distale dell'ileo terminale durante ogni laparatomia esplorativa. Se un diverticolo viene scoperto, e' bene—se possibile—asportarlo a scopo profilattico.

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Science and Art

Science and art belong to the whole world, and before them vanish the barriers of nationality.—*Goethe*

Art is I; science is we.—*Bernard*

Duodenal Obstruction*

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COPENHAGEN

WITH regard to the relation between megaduodenum and gastric ulcer in 1 of the cases here reported (Case 2) a juxtapyloric ulcer was revealed proximal to the dilatation, and it would seem that this ulcer, rather than the dilatation should be held responsible for the pain. This combination of megaduodenum and gastric ulcer is encountered too frequently in the literature to be a sheer coincidence (Duval and Gatellier, Hurst, Briggs, Rowlands, Jones and Ryle, Janker, Morlock and Gray, Wilkie). It is actually to be assumed that the megaduodenum may act as a predisposing factor in ulcer development when other ulcer producing factors are present, the predisposing factor must be the duodenal stasis.

Development and Prognosis.—Duodenal obstruction may take a hyperacute course as in acute dilatation of the stomach "acute arteriomesenteric ileus" (Wilkie) "gastromesenteric ileus" (Bloodgood), or the "dilatation gastroduodenale aigue", "l'occlusion duodenale aigue", "ileus arteriomesenterique aigue" of the French. The development may also be extremely slow, as in cases of megaduodenum depending upon congenital factors and occurring only in persons of fairly advanced age. The condition may progress steadily, or it may advance by fits and starts with periodical aggravation and attacks.

The prognosis which differs widely in the different forms of duodenal obstruction, is most unfavorable for the hyperacute condition and slightly better when the course tends to be chronic. For newborn children with complete atresia the prognosis is bad. In Sandblom's material (published by Ehrenpreis) comprising 8 such cases, 3 patients were so feeble that they could not be subjected to operation, 5 were operated upon, of whom 4 died, of 15 with incomplete stenosis 4 were given conservative treatment with good results, a gastroenterostomy was performed in 4 cases, with 2 deaths, and in 6 instances of torsion a detorsion was performed, terminating fatally in 2 instances.

Among cases of perforating gallstones the literature presents 3 in which conservative treatment brought about cure (Fiedler, Mintz, Schule). Of the total of 23 well elucidated cases which I have been able to trace from the available literature, 8 terminated fatally. To the total of 23 must be added the case here reported, in which the patient recovered. It must be possible to reduce this death rate of 33 per cent—by no means a small one—through roentgen examination, early operation, and particular attention to the fluid balance.

Another feature of the greatest significance in this connection, of course, is the condition underlying the duodenal obstruction. An incurable malignant tumor naturally offers a prognosis widely different from that (for instance) of chronic arteriomesenteric compression.

Treatment.—In certain cases, acute duodenal obstruction may be improved, and, by breaking a vicious circle, even cured by changing the position of the patient. In some cases the duodenal kink may be opened by turning the patient in the ventral position or onto the right side, and once the vicious circle is broken the symptoms may not return.

Acute obstructing adenitis may disappear when the causative lesion, most frequently appendicitis, has been cured. In cases of this type published by Duval and Roux, by Okinczyc, and by Wantoch, one of the compressing glands was removed (in addition to an appendectomy), in Okinczyc's case a duodeno-jejunostomy had to be performed (later) in addition. In the case of this type reported here (Case 6) the symptoms yielded to chemotherapy, which must be presumed to have cured the mesenteric adenitis.

When the presence of a duodenal obstruction has been ascertained, the general rule must be for surgical treatment, if possible,

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*Continued from Special (May) Issue.

TABLE 1.—*Cases in Which Diagnosis was Made at Autopsy*

Author	Sex	Age	Symptoms	Findings	Comments
Chomel (1710)	F	80	Very slight	22 gallstones in a diverticulum in the duodenum;	Death due to apoplexy
Harley (1857)	M	87		1 gallstone (weight 450 Gm.) in cul de sac in duodenum	
Hochhaus (1891)	M	67	Sudden onset; vomiting, constipation, loss of appetite; in place of gallbladder a palpable tumor, which disappeared later	Duodenum obstructed by a large gallstone (3.8 X 4 Cm.) at duodenojejunal flexure	
Atkinson (1895)	F	62	Pain, vomiting	Gallstone (1.2 X 2.5 cm.) impacted at duodenojejunal flexure	
Garin (1897)	F	82	Pain, vomiting, constipation, extreme emaciation	Superior part of the duodenum obstructed by large gallstone (weight 14 Gm.)	
Labadie, Lagrave & Madeleine (1898)	F	72	Many years of gallbladder disease; vomiting, loss of weight	Duodenum obstructed by large gallstone	
Dufour (1901)	F	50	Extreme emaciation; diarrhea; bronzed skin, resembling Addison's disease	Duodenum obstructed by large gallstone (21 X 34 mm.)	No particular symptoms of obstruction
Wakefield, Wickers & Walters (1939, Mayo Clinic)	F	31	Definite symptoms of intestinal obstruction	Duodenum obstructed by gallstone	

with removal of the obstruction, and otherwise with the establishment of a new communication. In many cases surgical intervention is clearly indicated even though the diagnosis is uncertain; the procedure will further depend upon what is revealed by the opening of the abdomen and upon the general condition of the patient.

The first case of congenital duodenal atresia in which the patient's life was saved by surgical means was published by the Danish surgeon Ernst in 1915; an antecolic duodenojejunal anastomosis was performed on an infant aged 11 days. This procedure, which was also used in 1 of the cases here reported (Case 3), has been successfully employed in the greater majority of the cases reported in the literature of acute as well as of chronic duodenal obstruction both in children and in adults (Benson and Grover; Bloodgood; Bolling*; Brattstrom; Clausen; Friman Dahl; Gregoire; Hellstrom; Kellogg and Kellogg; Rowlands; Schmieden and Kraas; de Witt Stetten*; Vilette; Wilkie). In a newborn child a posterior duodenojejunostomy may be technically very difficult. Schmieden recommends duodenojejunostomy with anteroenteroanastomosis and ligation of the afferent loop. Gastroenterostomy has likewise been employed with satisfactory results in some of the cases here reported (Cases 5, 7 and 8). In 1 of these cases (Case 7) pressure on the bile ducts later required anastomosis between the gallbladder and the stomach In the literature, gastroenterostomy has been recommended by several authors (Bager, Friman Dahl, Dahl Iversen, Gillespie, Janker Kurihara, published by Okada, Terrada and Hotta, Lee*, McNab, published by Campbell, Netousak, Perman, Petren, Richter*, Webb and Wangensteen*, Weeks and Delprat, Wilkie) this procedure is, however, said to be followed rather frequently by relapse, for which reason Villete has expressed the opinion that gastroenterostomy should be limited to cases in which it is impossible to perform duodenojejunostomy At the joint meeting in 1940 of the Boston Surgical Society and the Philadelphia Academy of Surgery, Lee reported the case of a newborn child in whom he had performed a preliminary jejunostomy followed by a successful gastroenterostomy eight months later

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*Operation performed on a newborn child.

A number of disadvantages have been emphasized as attaching to gastroenterostomy alone, Ladd (and also Webb and Wangensteen) have observed a vicious circle arise in a newborn child after this procedure, as the food passed along the nearest route to the obstruction and from there back to the stomach In these cases as well as in a case published by Sweet and Robertson a duodenojejunostomy had later to be resorted to Another drawback is that the bile has to pass backward to the stomach, where it neutralizes the acid and gives rise to anorexia (Ladd)

Particularly helpful is Morton's plastic procedure for incomplete atresia In this procedure the surgeon proceeds through a longitudinal incision across the stricture destroying this by means of a cautery and finally suturing it transversely When at all possible this is of course, the ideal method of operation

For megaduodenum, Schmieden has recommended resection with a Y-shaped anastomosis according to Roux if possible He reports

TABLE 2—*Cases in Which the Patient was Cured Without Operation*

Author	Sex	Age	Symptoms	Result
Fiedler (1880)	F	66	Similar attack one year previously, anamnesis 1 year epigastric pain, now collapse with severe pain and vomiting of hemorrhagic masses, repetition 8 days later—tumor palpable at site of gallbladder, next day tumor had disappeared symptoms subsided	Calculus weighing 12 Gm passed per anum 6 days later
Fiedler (1880)	F	34	Pain, extreme emaciation	Large calculus passed per anum 4 months later
Schule (1894)	F	35	Anamnesis of 3 years, vomiting loss of weight moderate pain in the right hypochondrium, now sudden pain and collapse resembling a perforation but no peritonitis, bile containing vomitus, symptoms subsided	Calculus 2 7 × 9 cm passed per anum 5 days later
Wilkinson (1897)	F	63	Vomiting, sharp pain distention of abdomen later symptoms subsided	Calculus size of pigeon's egg passed 11 weeks later
Duchesne (d'Orbec) (1897)	F	88	Vomiting sharp pain palpable tumor, symptoms subsided	Calculus size of pigeon's egg passed 4 days later
Mintz (1928)	F	61	2 phases (*a*) Cramplike abdominal pains vomiting fever (*b*) Hemorrhagic profuse vomiting block of evacuation, flatus symptoms subside	Calculus passed per anum 10 days later

a case (published by Kraas) in which he succeeded in resecting the megaduodenum to the ampulla of Vater and removed it, together with the pylorus. This procedure, which has also been employed in 2 of Rowland's cases and in Hurst and Briggs' case, is approximately identical with that employed in 2 of those here reported (Cases 2 and 4).

In children, when the obstruction has been caused by a volvulus, detorsion will be sufficient to remove the stenosis, and this procedure combined with fixation will be adequate, as may be seen from Rixford's case. Also, Ladd performs detorsion of a volvulus, mobilizing the cecum from the right and the ascending and proximal half of the transverse colon. When a bandlike adhesion is present it is an adequate procedure to cut this, so abolishing the obstruction; this has been described by Carter, among others. An idea of the chances offered to the newborn by the various methods is conveyed by some statistics from Boston (Ladd) concerning the operations and their results:

Intrinsic obstruction

Operation		Cured	+
Posterior duodenojejunostomy	10	6	4
Posterior gastroenterostomy	2	1	1
Jejunostomy (for nutrition)	1	0	1
	13	7	6

Extrinsic obstruction
(incomplete rotation)

Operation		Cured	+
Anterior gastroenterostomy	1	0	1
Anterior duodenojejunostomy	1	0	1
Reduction of volvulus	1	0	1
Ladd's operation	23	19	4
	26	19	7

In my opinion the proper procedure in cases of megaduodenum is to resect if possible, especially in view of the comparatively high incidence of peptic ulcer, which makes this procedure even more advisable. Resection should be done, at any rate, when the condition is complicated by an ulcer. On the other hand, it must be admitted that an ulcer may yield to subsequently instituted medical treatment when one of the predisposing factors, the duodenal stenosis, has been removed. If surgical treatment has to be employed with the patient in an extremely poor condition (as for instance in Hellstrom's case, in which the weight was 35 Kg. on admission) treatment must naturally be confined to one of the less radical procedures.

As for obstruction due to gallstones, the simplest procedure is removal through a gastrotomy (Bouveret; Mayo Robson; Thompson) when it is possible to push the calculus or calculi into the stomach. If this is impossible, removal can be accomplished through a duodenotomy (Andersen-Kraske, published by Gollinger; Pilcher; Taylor; Tupper); I have used this method successfully in 1 of the cases here reported (Case 1). These simple measures are decidedly to be preferred if the patient is in very poor condition. When treated in this way the patient retains the biliary fistula; this is, however, of no great significance, since a cholecystoduodenal fistula is not incompatible with prolonged life in a good state of health (McQueeny). In most cases the fistula will close spontaneously after removal of the stone, as is shown by the cases reported by Mayo Robson, Sheinfeld and Mackler, Wakefield, and Vickers and Walters. Should the patient feel any discomfort later, a cholecystectomy may be performed when the general state of health has improved; in some cases it will be necessary to combine cholecystectomy with resection of the pylorus. Tuffier confined himself to resection of the gallbladder, a part of which he removed, together with a part of the duodenum. Many other methods have been employed in these cases; some because the true character of the lesion was revealed only at the end of the operation, as was frankly admitted by Goullioud. Gastroenterostomy has been performed by Mickulicz (in the case published by Herz), by Goullioud, and by Venot; this procedure has been followed by resection in some cases (Tuffier). Cholecystectomy has been performed alone (Sheinfeld and Mackler), combined with duodenarraphy (Blake's case, published by Friedmann), or with resection of the stomach (Fleschhauer's case and also Schede's, published by Wegele). Scofield made a combination of simple duodenotomy and cholecystectomy, choledochotomy and resection of the gallbladder. Pyloroplasty has been employed, as was mentioned by Waugh.

TABLE 3.—*Operative Cases*

Author	Patient's sex	Patient's age	Symptoms	Pathologic picture	Operation	Result	Comment
Taylor, 1884	F	66	Slight symptoms of a rather long duration, pain, vomiting	Lowest ⅕ of duodenum obstructed by large gallstone measuring (1 × 1½ inches, 2.5 × 3.7 cm)	Calculus removed	Death on 5th p o day	
Bouveret 1896	M	46	Sudden sharp pain loss of weight	Duodenum obstructed by gallstone protruding partly through fistula immediately below pylorus	Calculus removed through stomach	Death from hemorrhage on 3d p o day	Similar attacks two years previously, stone size of nut passed per anum
Herz, 1896 (operation by v Mickulicz)	F	44	Pain and vomiting for 1 year loss of weight (18 kg)	Duodenum obstructed by gallstone	Gastroenterostomy	Recovery	
Monprofit 1897	F	58	Previous attacks vomiting and jaundice loss of weight palpable tumor	Large node corresponding to duodenum *inoperable*	None	Death	Autopsy revealed large gallstone obstructing duodenum immediately below pylorus
Wegele 1898 (operation by Schede)	M	48	Anamnesis 6 years epigastric pressure constipation loss of weight	Duodenum obstructed by large gallstone, 4 smaller stones also present	Cholecystectomy + resection of pylorus	Death	
Fleischhauer, 1899	F	37	Pain vomiting loss of weight 1 year	Pylorus obstructed by large gallstone	Calculus removed through stomach pylorus extirpated 45 smaller calculi removed from gallbladder	Recovery	
Pilcher 1902	F	60		Duodenojejunal flexure obstructed by gallstone diameter 1 inch (2.5 cm)	Stone removed	Recovery	

TABLE 3.—*Operative Cases (Continued)*

Author	Patient's sex	Patient's age	Symptoms	Pathologic picture	Operation	Result	Comment
Tupper, 1903	F	31	Pain 6 years; numerous attacks; vomiting, loss of weight, palpable tumor	Duodenum obstructed by numerous faceted gallstones	18 calculi removed through gastrotomy; after which other stone passed	Recovery	
Collinger, 1903 (operation by Kraske)	F	43	Loss of weight; vomiting, pain; palpable tumor	Duodenum obstructed by large gallstone	Calculus removed through duodenotomy	Recovery	
Friedmann, 1908 (operation by Blake)	F	35	Attack 6 years previously; pain, vomiting, loss of weight; palpable tumor; *cramps in legs and fingers*	One big stone and some smaller ones impacted in a cul de sac obstructing duodenum	Cholecystectomy + gastroenterostomy + duodenorrhaphy	Recovery	
Mayo-Robson, 1909	M	76	Pain in right hypochondrium; vomiting	Duodenum obstructed by large gallstone (3 × 3.5 cm.)	Calculus removed through stomach	Recovery	Fistula to the colon
Thompson, 1912	M	65	Anamnesis 9 months; pain, vomiting, loss of weight	Large node corresponding to duodenum	Node sprang into stomach and proved to be gallstone 4.5 × 2.6 cm; calculus removed through stomach	Recovery	
Tuffier, 1914	F	51	Vomiting, loss of weight, pain	Duodenum obstructed by gallstone	Gastroenterostomy; 2 stages; resection of pylorus + resection of gallbladder, part of which was removed with part of duodenum	Recovery	
Okinczyc, 1921	F	Not mentioned	Not mentioned	Duodenum obstructed by large gallstone	Not mentioned	Not mentioned	

TABLE 3—*Operative Cases (Continued)*

Author	Patient's sex	Patient's age	Symptoms	Pathologic picture	Operation	Result	Comment
Bérard, 1921	Not mentioned	Not mentioned	Not mentioned	Duodenum obstructed by large gallstone	Gastroenterostomy + removal of the stone	Not mentioned	Reported at same meeting (Soc. de Chir. de Paris)
Santy, 1921	Not mentioned	Not mentioned	Not mentioned	Duodenum obstructed by large gallstone	Gastroenterostomy + removal of stone	Not mentioned	
Goullioud, 1921	F	62	Vomiting, pain, loss of weight, palpable tumor	Pylorus obstructed by large gallstone (29 × 17 mm)	Gastroenterostomy + duodenotomy, removal of stone	Recovery	
Venot, 1922	F	40	Vomiting, loss of weight		Gastroenterostomy	Recovery	Large stone passed per anum one month later
Brocq, Brodin & Aimé, 1929	F	50	Crisis one year previously, vomiting loss of weight	Stone *found* in jejunum at operation	Calculus was removed	Death	Diagnosis made by roentgen examination, patient first refused operation but agreed at new crisis
Scofield, 1930	F	60	Biliary anamnesis with jaundice, pain loss of weight, *no symptoms of obstruction*, NPN 33 6 mg , blood urea 14	Duodenum obstructed by 10 gallstones	*Duodenotomy*, by which 10 gallstones were removed + cholecystotomy with removal of 1 gallstone + choledochotomy with removal of 2 gallstones	Recovery	*No fistula or scar between gallbladder and duodenum*
Mitchell (cited by Mondor), 1930	Not mentioned	Not mentioned		Node corresponding to pylorus, taken to be cancer	Gastroenterostomy	Death few days later	Autopsy revealed 2 gallstones obstructing pylorus and duodenum; 1 of these in fistula between gallbladder and duodenum, the other in gallbladder

TABLE 3.—*Operative Cases (Continued)*

Author	Patient's sex	Patient's age	Symptoms	Pathologic picture	Operation	Result	Comment
Crane, 1931	M	80	Acute onset with pain; vomiting, loss of weight; comparatively unaffected; walked into ward after traveling 60 miles by motor	Duodenum obstructed by a gallstone at the duodenojejunal flexure	The stone was removed	Death on the 4th p.o. day	The diagnosis was made at the X-ray examination
Waugh, 1937 (Mayo Clinic)	M	72	Anamnesis 1 year; sharp pain, vomiting, loss of weight (15 Kg.); jaundice on one occasion	Duodenum obstructed by 2 gallstones	Pyloroplasty + Cholecystostomy by which 65 calculi were removed	Recovery	At the X-ray examination the disease was taken to be a duodenal ulcer: no function of the gallbladder
Wakefield, Vickers & Walters, 1939 (Mayo Clinic)	F	44	Recurring symptoms of intestinal obstruction	Duodenum obstructed by a gallstone	Not mentioned	Recovery	
	M	49	Definite symptoms of intestinal obstruction	Duodenum obstructed by a gallstone	Not mentioned	Recovery	
Andersen, B., 1942	F	65	Anamnesis 10 years; vomiting, loss of weight	Duodenum obstructed by a plum-sized gallstone	Duodenotomy with removal of the stone	Recovery	At the X-ray examination the diagnosis was taken to be a polypous tumor
Sheinfeld & Mackler, 1943	F	62	Previous attacks; vomiting; urea nitrogen 12.5 mg. %	Duodenum obstructed just below pylorus by large gallstone (6.5 × 4 × 4 cm.)	Calculus removed through stomach: cholecystectomy	Death same day	Roentgen picture revealed large stone in right upper quadrant of abdomen
Author, 1945	M	64	Jaundice several times previously; now pain, eructation, once vomiting; extreme emaciation	Duodenum obstructed by large gallstone size (8 × 4.5 cm.), weight 54 Gm.	Duodenotomy with removal of calculus	Recovery	Diagnosis made on roentgen examination

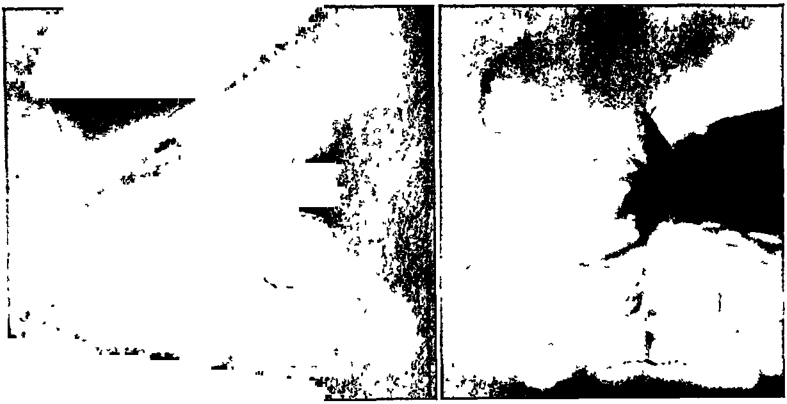


Fig 1 (*Case 1*).—Roentgenogram of the superior part of the duodenum obstructed by large gallstone

Devine, being one of those who consider chronic duodenal obstruction ascribable to in coordination between the innervation of the sphincters and the musculature of the wall interrupts impulses through the sympathetic innervation of the stomach by dividing this organ and implanting the cardial end into the jejunum. This method, however, is impossible only when there is no organic stenosis in the pylorus or the duodenum that may close the pyloric sac.

In cases of acute obstruction most patients are unable to tolerate an extensive and complicated procedure, for which reason the simpler operations, such as duodenotomy or gastrotomy, should be preferred If necessary further surgical measures can be carried out later.

REPORT OF CASES

Case 1.—A 64-year-old man had had icterus on two occasions. He became ill with gastric pain, eructation and an attack of vomiting. He was sent to the hospital in great haste and in extremely poor condition. In the region of the gallbladder there was deep resistance to palpation. Roentgen examination of the stomach (Fig. 1) revealed cholecystoduodenal perforation, probably caused by a calculus in process of being delivered from the gallbladder into the bulb. The onset of pneumonia prevented immediate operation. Treatment with sulfathiazole was given, after which I opened the abdomen Total obstruction of the duodenum was

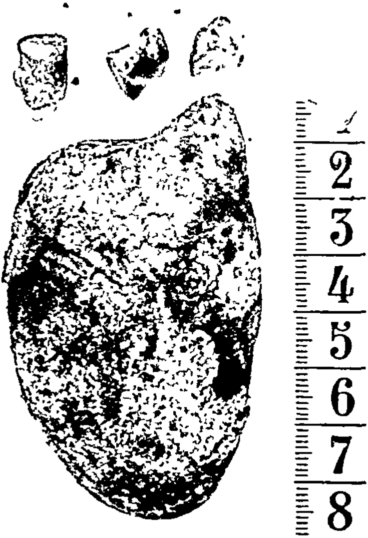


Fig. 2 (*Case 1*) —Gallstones removed at operation.

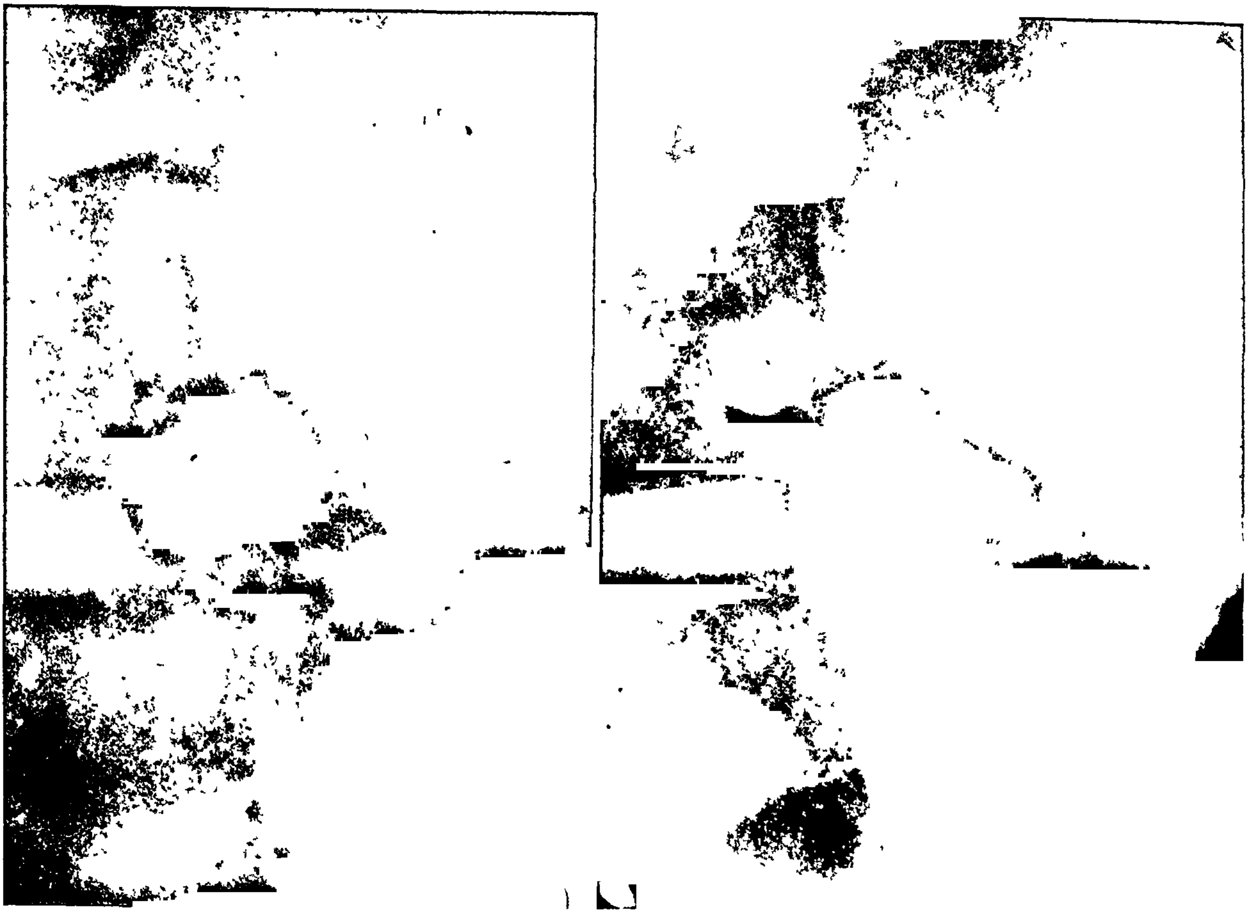
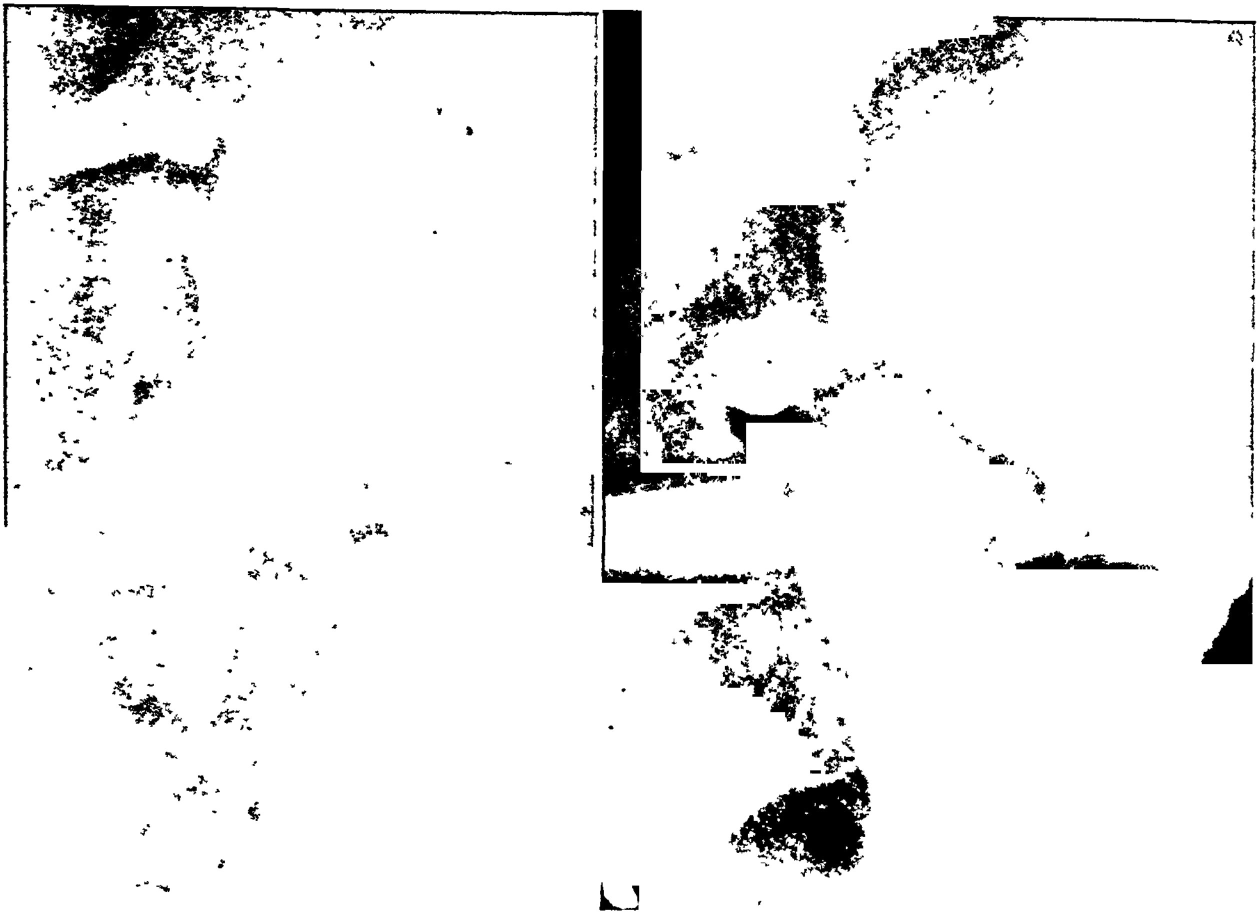


Fig. 3 (*Case 1*).—Roentgenogram of superior part of duodenum on reexamination one and one half years after the operation.

observed, caused by an enormous gallstone that had perforated into the duodenum. This stone, together with four smaller ones (Fig. 2), was removed through a transduodenal duodenotomy. After a postoperative course complicated by two relapses of pneumonia (controlled with penicillin) the patient was discharged in good condition. At reexamination there were no abdominal complaints; the roentgenogram showed a diverticulum the size of a hazelnut from the bulb (Fig. 3). The patient eventually died of cardiac failure. Autopsy revealed a sac slightly larger than a hazelnut and wide open into the duodenum; this sac represented the stump of the gallbladder left at the operation. The cystic duct was preserved and rather thin.

Comment.—The cause of the duodenal obstruction was definite in this case; a large gallstone had perforated into the duodenum, obstructing the lumen completely. The stone was removed and the passage reestablished surgically. In view of the poor condition of the patient, cholecystectomy could not be performed. The clinical picture was dominated by pain and emaciation. Vomiting occurred on one occasion.

Case 2.—The patient was a 35-year-old man who had never previously suffered from any gastric trouble. In the course of two years dyspeptic symptoms developed, with smarting pains radiating from the epigastrium to the right side of the back and relieved by food. Slight constipation was present. The patient was in good general condition, though slightly dehydrated. Roentgen examination revealed a large megaduodenum, with an ulcerous niche immediately proximal to the dilatation (Fig. 4). He was operated upon (by myself) with removal and sewing down of the megaduodenum; in addition, a typical resection of the pylorus was performed with an antecolic gastroenterostomy, as the transverse mesocolon was too narrow to permit the establishment of a posterior anastomosis. After a somewhat troublesome postoperative course, complicated by pneumonia and thrombophlebitis, the patient was discharged symptom-free. At follow-up examination he was still feeling better,



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Comment.—In Case 2 it is impossible to make any definite statement as regards the cause of duodenal dilatation. The very narrow transverse mesocolon suggests a congenital anomaly, but it was impossible to demonstrate any pathologic features in the region of Treitz's ligament. A [illegible] scopic examination was [illegible] to be held responsible for a [illegible] obstruction, besides which it was hardly large enough to cause any compression at all. The ulcer itself was situated proximal to the dilated portion of the bowel and consequently could not be regarded as the direct cause of the [illegible]

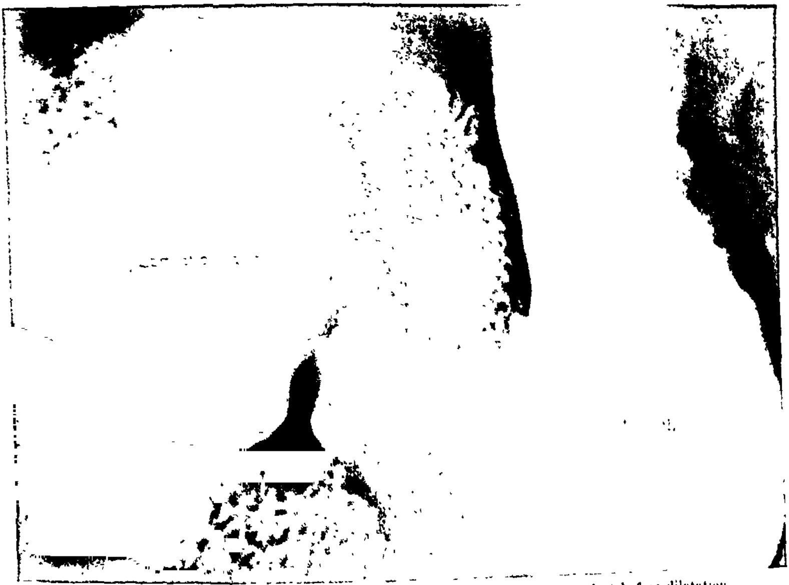

Fig. 4 (*Case 2*).—Roentgenogram of megaduodenum with ulcer in pylorus just before dilatation.

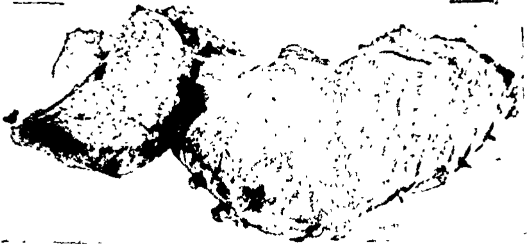

Fig. 5 (*Case 3*).—Megaduodenum and a part of stomach removed at operation.

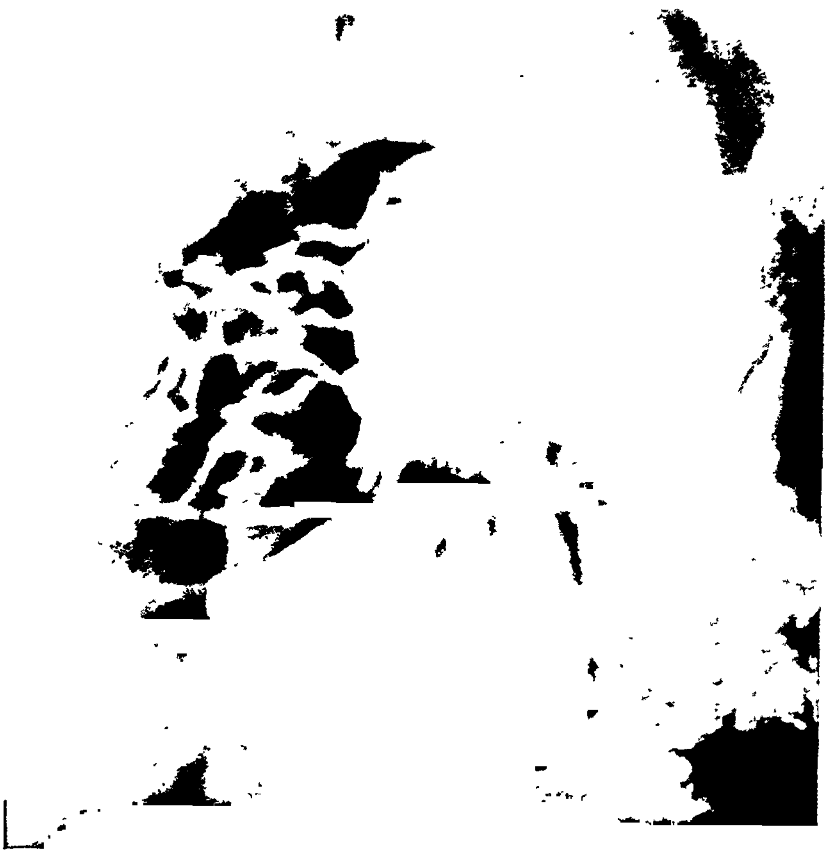

Fig. 6 (*Case 4*).—Roentgenogram showing distention and evidence of relative obstruction (arteriomesenteric) in duodenojejunal flexure.

obstruction. Functional enlargement of the duodenum, such as may be seen aboral to an ulcer, was out of the question. The cause may have been a combination of extensive periduodenal adhesions and a congenital anomaly, of which the very narrow mesocolon may be taken as an expression. Possibly the case should be classified with Duval's cases of "periduodenite essentielle stenosante", but even this diagnosis calls for a further etiologic and genetic evaluation. The clinical picture in this case was dominated by pain, for which the ulcer may have been responsible.

Case 3.—In a similar case, which also came under my observation, operation was performed by Axel Lendorf and published in detail by Nordentoft. The patient was a 25-year-old man who since childhood had suffered from periodic epigastric discomfort, consisting of pressure and smarting pains radiating from the epigastrium and the umbilical region to the sides and the back; these were often accompanied with considerable distention of the abdomen. The pains had no relation to meals, and there had never been vomiting or eructation. Roentgen examination showed a greatly dilated duodenum, almost the size of the stomach. Operation revealed great dilatation of the duodenum, a long Treitz's ligament and numerous firm periduodenal adhesions. A duodenojejunostomy was performed, and Treitz's ligament was divided, although it was not thought to be solely responsible for the obstruction. The patient was discharged in good condition.

Comment.—Again, in this case, the pathogenesis is not quite clear. Probably the causative factor is to be found in the numerous firm periduodenal adhesions, so that Case 3, like Case 2, should possibly be grouped among Duval's cases of "periduodenite essentielle stenosante".

Case 4.—A 27-year-old woman, a nurse, had suffered for four years from gastric discomfort

[illegible]

Fig. 7 [illegible]

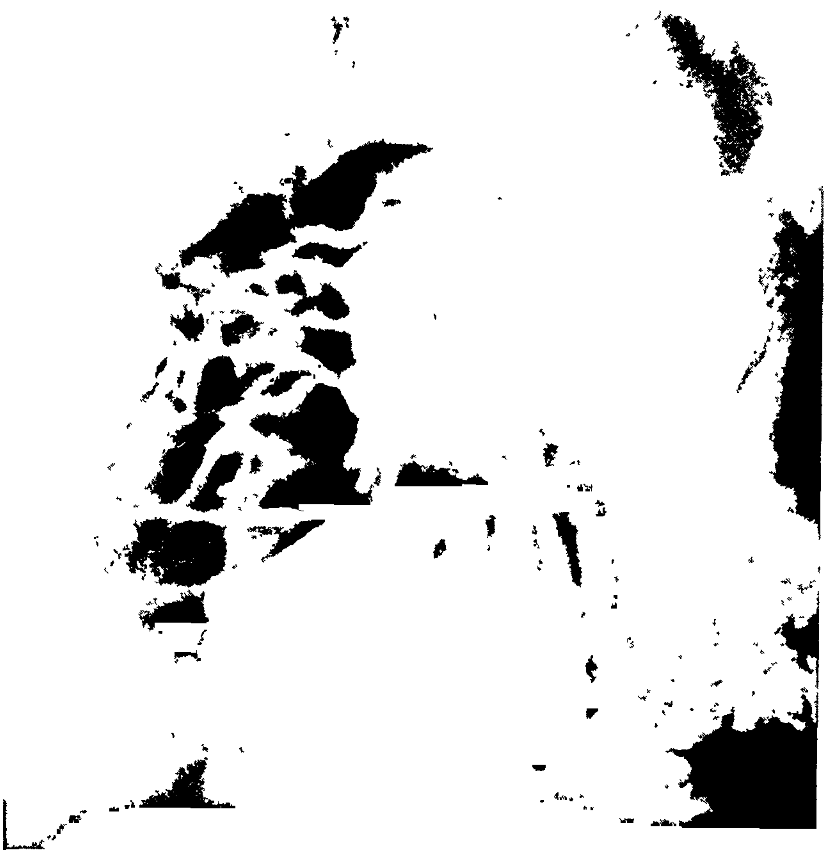

Fig. 6 (*Case 4*).—Roentgenogram showing distention and evidence of relative obstruction (arteriomesenteric) in duodenojejunal flexure.

obstruction. Functional enlargement of the duodenum, such as may be seen aboral to an ulcer, was out of the question. The cause may have been a combination of extensive periduodenal adhesions and a congenital anomaly, of which the very narrow mesocolon may be taken as an expression. Possibly the case should be classified with Duval's cases of "periduodenite essentielle stenosante", but even this diagnosis calls for a further etiologic and genetic evaluation. The clinical picture in this case was dominated by pain, for which the ulcer may have been responsible.

Case 3.—In a similar case, which also came under my observation, operation was performed by Axel Lendorf and published in detail by Nordentoft. The patient was a 25-year-old man who since childhood had suffered from periodic epigastric discomfort, consisting of pressure and smarting pains radiating from the epigastrium and the umbilical region to the sides and the back; these were often accompanied with considerable distention of the abdomen. The pains had no relation to meals, and there had never been vomiting or eructation. Roentgen examination showed a greatly dilated duodenum, almost the size of the stomach. Operation revealed great dilatation of the duodenum, a long Treitz's ligament and numerous firm periduodenal adhesions. A duodenojejunostomy was performed, and Treitz's ligament was divided, although it was not thought to be solely responsible for the obstruction. The patient was discharged in good condition.

Comment.—Again, in this case, the pathogenesis is not quite clear. Probably the causative factor is to be found in the numerous firm periduodenal adhesions, so that Case 3, like Case 2, should possibly be grouped among Duval's cases of "periduodenite essentielle stenosante".

Case 4.—A 27-year-old woman, a nurse, had suffered for four years from gastric discomfort meals were typical of intermittent duodenal obstruction, furthermore there were vomiting and emaciation It is typical also that the patient was relieved in the genucubital position or with her head placed low

Case 6—A 20 year old man had been suffering from increasing sensations of fullness in the epigastrium, with vomiting and emaciation for about one year Roentgen examination revealed an obstruction of the inferior horizontal part of the duodenum, relieved by taking certain ventral positions, the cause could not be certainly established It was assumed to be the result of pressure on the duodenum in certain positions it seemed improbable that there were any pathologic processes in the duodenal wall itself Arteriomesenteric compression, therefore possibly combined with adhesions was believed to have caused the condition At operation the causal factor was found to consist of swollen glands in the mesentery of the small intestine An appendectomy was also done The patient was treated with Elkosin in order to cure a possible infectious disease of the glands and was discharged improved His improvement had been maintained to the time of the follow up examination, slightly over a year after the operation

Comment—In the present case the pathogenic factor has been fully established as swelling of the glands in the mesenteric root Chemotherapy directed against this glandular disease resulted in essential improvement The clinical picture was dominated by sensations of fullness in the epigastrium vomiting after meals and some emaciation The roentgen picture was typical of compression of the duodenum

Case 7—A 57 year old man had suffered for forty years from symptoms suggesting an ulcer in the stomach, he had been treated medically several times, each time with some improvement Some years before his admission to the hospital the roentgen picture showed a considerable increase in the size of the prevertebral soft tissues He was admitted with pain in the left side of the epigastrium, nausea and vomiting about three hours after meals The left upper part of the abdomen was distended He was in poor condition slightly dehydrated Laparotomy failed to demonstrate any ulcer, and a vagotomy was performed The patient was discharged After having been without symptoms for some time, he was readmitted with vomiting and distention of the left upper part of the abdomen He was now emaciated and dehydrated and aspiration revealed a stagnant gastric content of 500 ml The roentgen picture revealed an obstruction of the duodenum The icterus index was normal Operation revealed a considerable increase in size of the pancreas and distention of the duodenum which was dislocated and compressed corresponding to the pancreas and a large gallbladder A gastroenterostomy and an enteroenteroanastomosis were performed and the gastric retention disappeared An increase in the icterus index called for reoperation, with establishment of an anastomosis between the gallbladder and the pyloric canal About one month later the patient died of miliary tuberculosis Autopsy revealed a papillary carcinoma of the pancreas

Comment—In this case the duodenal obstruction was clearly established as due to the malignant tumor of the pancreas The principal symptoms were pain nausea vomiting occurring some three hours after meals and distention of the left upper part of the abdomen There was a considerable volume of stagnant contents in the stomach Besides the patient was dehydrated There can hardly be any genetic relation between the duodenal stenosis and the ulcer demonstrated by roentgenogram in this case as clearly the ulcer dated farther back than the malignant tumor

Case 8—A 66 year old man had suffered from pain in the epigastrium and eructations for three months The pain occurred periodically without any relation to meals He also complained of foul breath and constipation and his weight had decreased by about 18 Kg He was admitted to the hospital in comparatively good general condition although slightly emaciated The stomach presented itself as a large prominent tumor on the abdomen, a lapping sound could clearly be heard From 1 to 2 liters of stagnant contents could be aspirated from the stomach The patient was slightly dehydrated Roentgen examination showed marked dilatation of the stomach and of the duodenum as far as the mesenteric root, none of the contrast medium passed this level (Fig 9) Operation revealed an area of hard resistance corresponding in position to the pancreas which was firmly adherent to the posterior abdominal wall An antecolic gastroenterostomy was performed and the patient was discharged Microscopic examination revealed adenocarcinoma

Comment—In this case too the obstruction of the duodenum was ascribable to a malignant tumor of the pancreas The clinical picture also was typical and it was not complicated by other lesions The patient had suf

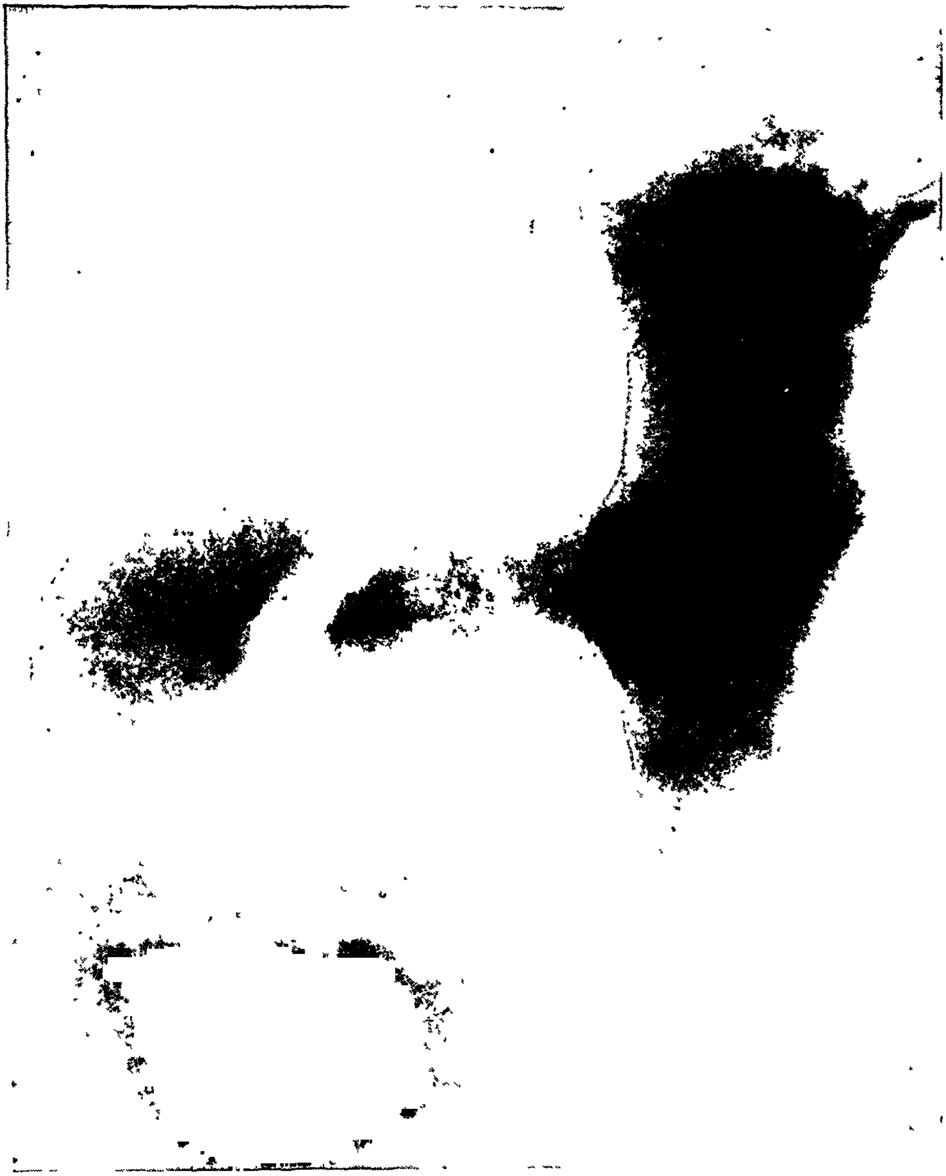

Fig. 8 (*Case 6*).—Roentgenogram showing compression of duodenum due to enlarged glands in root of mesentery.

greatly exhausted and emaciated, and roentgen examination during attacks revealed the duodenum distended to twice its normal size, the dilatation extending to the midline. By operation, which confirmed the dilatation, a taut mesenteric root was observed, extending across the horizontal part of the duodenum and the small intestine, which was situated deep in the true pelvis. Gastroenterostomy was performed. The patient was discharged in good condition, and a follow-up examination showed considerable improvement. Seen again on April 15, 1950, she was completely well, as far as the stomach was concerned.

Comment.—The cause of the duodenal obstruction in this case seems to have been fully established as the taut mesenteric root extending across the horizontal part of the duodenum; the handing down of the small intestine in the true pelvis also played an important role. Consequently, the case was one of typical arteriomesenteric compression. The development of the clinical picture was also typical after the lesion in the biliary system had been brought under control. The pains were no longer of the dyskinetic type but, being located in the right side of the epigastrium and occurring some time after

Prolonged Postanesthetic Depression and Apnea Attributed to Decamethylene-bis (Trimethylammonium Bromide)

M S SADOVE M D, F I C S,* D W MAC FARLANE M S, AND
E W PELIKAN, M S
CHICAGO

DECAMETHYLENE BIS (trimethylammonium bromide, or C 10 (Syncurine®)* has been reported as a relaxant to skeletal muscle and has been introduced into clinical medicine by workers in Great Britain as a substitute for curare At present the drug is undergoing clinical trial in the United States

Although C 10 produces skeletal muscle relaxation and may be used as an *adjuvant* agent in anesthesiologic procedure its pharmacologic properties are sufficiently different from those of d tubocurarine chloride to merit the careful attention of the clinician For example, C 10 is more potent than is d tubocurarine weight for weight, has a shorter duration of effect, and is not antagonized by anticholinesterases[1]

This case is reported as a probably untoward and prolonged response to C 10 and as a possible contribution to the clinical toxicology of the drug

REPORT OF CASE

W B J, a white man 48 years old slightly obese complained of itching jaundice and acholic stools of six weeks' duration Physical examination and chemical studies of the blood confirmed the diagnosis of extrahepatic biliary obstruction of unknown origin, and of impaired hepatic function The urine contained a few hyaline and granular casts, and the value for nonprotein nitrogen was 70 mg per hundred cubic centimeters Exploratory laparotomy was performed on Aug 27 1949

Preanesthetic medication of the apprehensive patient consisted of administration of morphine sulfate (10 mg) and scopolamine (0 4 mg) about one hour prior to operation Induction at 8 30 a m was with 0 46 Gm of sodium pentothal in 2 per cent solution and anesthesia was maintained with small amounts of ether and cyclopropane both with oxygen by the closed circle endotracheal technic

C 10 (Syncurine ^{HR}) was administered intravenously in a dose of 2 3 mg during the pentothal induction after which the patient was intubated and manual supplemental respiration was provided Forty five minutes after induction of anesthesia, relaxation was deemed inadequate and an additional 2 0 mg of C 10 was administered Further relaxation was required at 9 45 a m (thirty minutes after the second dose), and 4 mg of C 10 was injected After this artificial respiration was required and was adequately maintained At operation a neoplasm of the ampullar area was diagnosed and a choledochoduodenostomy was performed The operation was uncomplicated and 500 ml of compatible blood plus 500 ml of 5 per cent dextrose in water and 1 liter of 5 per cent dextrose in 0 9 per cent solution of sodium chloride were administered by venoclysis during and following the two hour surgical procedure The blood pressure fluctuated around 110 systolic and 70 diastolic and the pulse rate remained between 70 and 80 per minute during the operation

No additional anesthetic agent was added to the closed circle system after 9 45 a m The patient's condition was considered good when the operation was completed at 10 30 a m at this time, all anesthetic gases were being eliminated from the system but the patient showed no signs of recovery from the depressed state Artificial respiration with an excess of oxygen (5 liters per minute) was maintained until 12 M when 0 25 mg of prostigmine was given intravenously After administration of the drug shallow, spontaneous gasping diaphragmatic respiration began The patient was areflexic and atonic and there was no activity of the intercostal musculature The pupils were 6 to 8 mm, round and equal and did not react to light Supplemental respiration was maintained after the diaphragmatic respiration had begun

At 12 45 p m the administration of pentamethylene bis (trimethylammonium iodide) (C 5) was contemplated but it was considered that the

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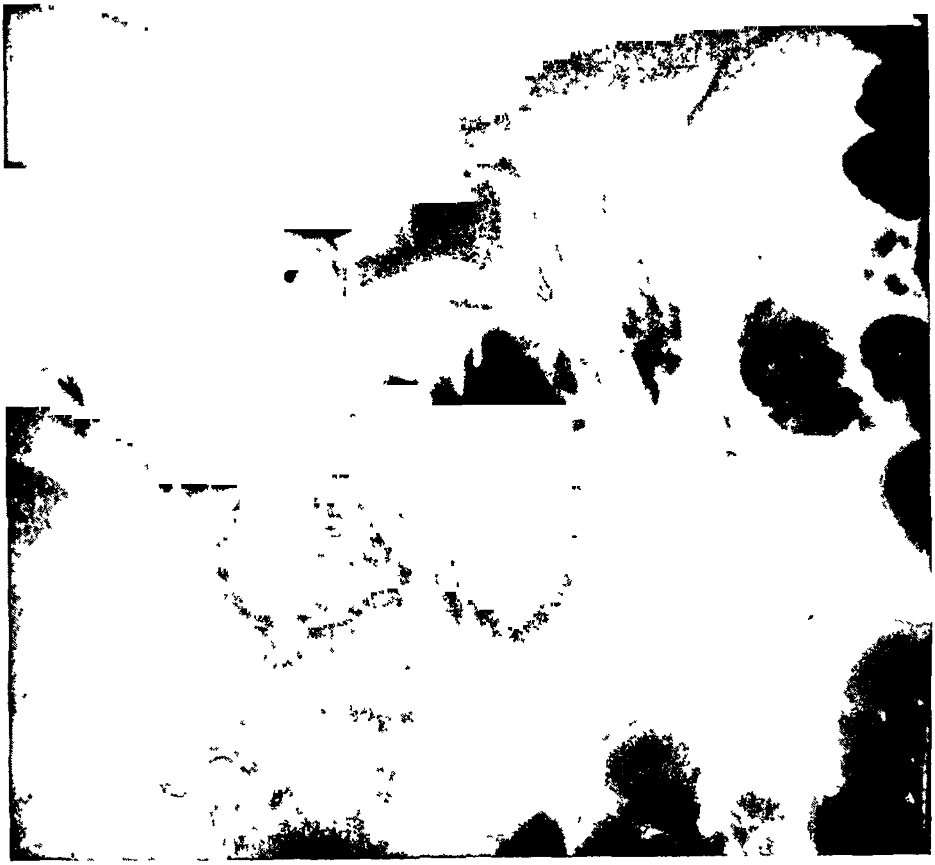

Fig. 9 (*Case 8*).—Roentgenogram of greatly dilated stomach. Pylorus is wide and open; no tumor or ulcer is demonstrable.

fered from pain in the epigastrium, foul breath, nausea and eructation. Furthermore, considerable stagnation of the gastric contents was demonstrable, and there was slight dehydration.

RÉSUMÉ

On fait un rapport sur les facteurs étiologiques et pathogéniques causant l'obstruction duodénale, et 8 cas sont présentés illustrant les caractères des différents types de cette affection. On décrit un tableau clinique de l'obstruction duodénale, en insistant tout particulièrement sur la déshydration de l'organisme. On présente un tableau indiquant les cas comparativements peu nombreux dans la litérature médicale que l'on peut trouver et dans lesquels la perforation par les calculs biliaires fut la cause du début de l'infection. Une mention spéciale est faite des relations du mégaduodenum et de l'ulcère peptique. On donne un traitement détaillé de l'obstruction duodénale dans ses formes variées.

RIASSUNTO

Dopo avere accennato all'etiologia ed alla patogenesi dell'ostruzione duodenale, l'A. descrive 8 casi onde illustrare le diverse varieta' cliniche. Un particolare interesse viene attribuito ai casi in cui un calcolo biliare perforante diviene causa di un'ostruzione duodenale: l'A. riunisce in una tabella i casi finora illustrati nella letteratura. Sottolinea inoltre i rapporti framegaduodeno ed ulcera peptica. Delinea infine la cura di questa condizione morbosa, attribuendo naturalmente un particolare valore al mantenimento del ricambio idrico.

tion of the observed phenomena may be explained most probably as atypical responses to C 10

SUMMARY

A case of prolonged postanesthetic depression and apnea, considered to be due to repeated doses of C-10, is presented as a caution in the use of decamethylene bis (trimethylammonium bromide)

RÉSUMÉ

On présente pour prévenir des dangers de l'usage de la décaméthylène bis (triméthyl ammonium bromide), un cas de dépression et d'apnée postanesthétique prolongé considéré comme étant dû à des doses répétées de C 20

RESUMEN

Se presenta un caso de depresión postanestésica prolongada y apnea, que se consideró causado por dosis repetidas de C 10, para que se adopten precauciones al usar el decametileno bis (gromuro trimetilamonio)

RIASSUNTO

Nel presentare un caso di prolungata depressione postanestetica e di apnea successive a ripetute dosi di C-10 l'A consiglia molta prudenza nell'uso di decametilene—bis (bromuro di trimetilammonio)

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The United States Chapter of the International College of Surgeons

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danger of hypotension was sufficient to outweigh the possibility of antagonism, which this drug is reported to have for C-10.[2] Because of the earlier apparent response to the drug, 0.25 mg. of prostigmine and 2 cc. of Coramine“^{R} were given intravenously, without noticeable effect. At this time the pupils reacted to light by dilating.

At 1:30 p.m. the blood pressure had dropped to 90 systolic and 50 diastolic; by 1:50 it was 66 systolic and 30 diastolic, but paradoxically the pulse rate had dropped to 45 beats per minute. Desoxyephedrine, 20 mg., was given intravenously; the blood pressure rose to 110 systolic and 54 diastolic, the pulse rate was 50 per minute. During the next four hours the blood pressure was maintained with desoxyephedrine and neosynephrine, a total of 40 mg. and 0.2 mg. respectively, given intravenously.

At 2:00 p.m., three and one-half hours after abdominal closure, a hyperthermic state was noted (oral temperature 103.6 F.). The temperature slowly returned to normal after application of cold wet towels and ice packs to the trunk.

At 3:30 p.m., 100 mg. of nicotinic acid was added to 1 liter of 5 per cent dextrose in 0.9 per cent sodium chloride and administered as a slow intravenous drip to promote cerebral circulation. The pulse rate at this time was 76 per minute, and occasional dropped beats were noted. At 3:35 evidence of a swallowing reflex was noted, a weak cough was elicited during the tracheo bronchial toilet, and minimal activity of the intercostal muscles was also observed. The pupils now reacted to light with a normal consensual reflex constriction. Within the next hour the heart rate had become regular; facial mobility had returned, with wrinkling of the brow, flutter of the eyelids and increasing tone of the jaw muscles, until at 4:30 p.m. the patient's eyes turned toward the observer on command. The paralysis of the extremities was still complete. At 5:15 (nearly seven hours after the operation) the first spontaneous movements of the patient's arms were noted, and at 5:45 he made a feeble attempt to squeeze the observer's hand on command. At this time the lower extremities were still atonic and areflexic.

Recovery progressed. At 7:30 p.m. the patient spoke for the first time and had good muscular control of the extremities. He stated that he had no memory of any event following his entry into the operating room. His speech was rational. His sensorium was apparently clear, and observation on subsequent days indicated that cerebral function was normal. Cerebral damage was not anticipated, because at no time during the operative procedure or the immediate postoperative period were there any signs to indicate that anoxia, hypoxia or cerebral vascular accident had occurred. From 7:30 p.m. until his discharge nineteen days later, his blood pressure and temperature remained within normal limits, and his further hospital course was uneventful.

COMMENT

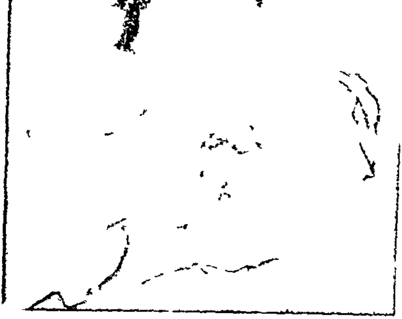
Because of the many variable and uncontrolled factors in the condition and management of this patient, we are unable to explain many of the phenomena observed. There was undoubtedly impairment of hepatic function and, probably of renal function also, which, resulting in the slowed and ineffective metabolism of at least one of the anesthetic agents used, might have contributed to the response in this particular case; a number of cases have been reported in which there were long periods of central depression due to the use of sodium pentothal in patients with hepatic damage.[3] Our ignorance of the metabolic fate of C-10 precludes speculation upon the possible role of renal and hepatic damage in prolonging the response to C-10. However, during the course of recovery, a marked similarity was observed to the recovery from C-10 as we observed it in normal subjects.[4] The order of return of function was roughly the same, but in this case it was prolonged over a period of several hours. The comparatively large doses (8 mg. or more) used in this case, and in certain cases to be cited, may be a major contributing factor, though they have been well within the recommended limit of dosage specified by the makers of the product. Even larger doses than those used in this case have been given with anesthesia by one of us (M.S.S.) without unexpected sequelae, but perhaps, as may be expected from the normal distribution of responses to any drug, an occasional patient may show great sensitivity when larger doses of this drug are used.

Two similar cases, in each of which repeated doses of C-10 were used and in which recovery time was slightly shorter than in this one, have been described to us by Dr. J. S. Lundy of the Mayo Clinic, and a case was reported in the literature in which death was attributed directly to the use of repeated doses of C-10 in a patient with probable impairment of renal function.[5]

It is our impression that, although many factors must be considered, an inordinate por-

Fi 1

4 year old white woman Note extensive ceration of axilla and lateral chest wall Histologic diagnosis was Grade I epidermoid carcinoma



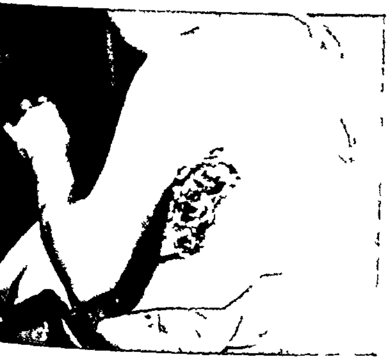


Fig 2

Same patient Note extensive infection and ulceration of the Marjolin ulcer

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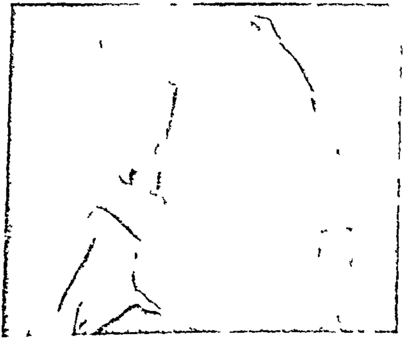
ote extensive scars of breast, arm and chest



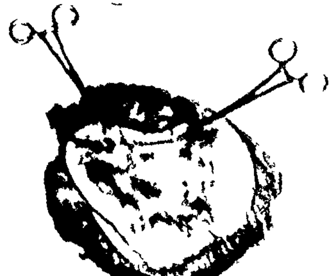


Fig 4

Postoperative specimen Block dissection of axilla and lateral chest wall The left breast removed by undermining, is not shown

Nitrofurazone in Skin Grafting

JEROME H. MEYER, M.D.
DAYTON, OHIO

THE causes of failures in skin grafting are agreed to be (*1*) infection (the most common[1]); (*2*) movement of the graft; (*3*) ooze of blood or serum beneath the graft, and (*4*) poor general condition of the patient (anemia, hypoproteinemia, avitaminosis). The transient group of bacteria, according to Lovell,[2] are the greatest offenders. They are *Bacillus pyocyaneus,* followed in frequency by *Streptococcus, haemolyticus, Staphylococcus aureus, Escherichia coli and Bacillus proteus.*

The desire to control the infection has led to the use of antibiotics and a multitude of ointments for local application. The reluctance of a surgeon to try the newer bacteriostatic and bactericidal ointments is understandable. The reason given is that one cannot destroy bacteria without destroying a delicate skin graft, since both are complex proteins.

My associates and I have used Nitrofurazone N.N.R. (5-nitro-2-furaldehyde semicarbazone[*]) in control of infection since the publication of Snyder, Kiehn and Christopherson.[3] The clinical and laboratory observations concerning its bacteriostatic and bactericidal action have been adequately studied and presented by Shipley and Dodd.[4]

It is the purpose of this case report to show that nitrofuran in this form can be used to control infection and reduce the odor of the wound without preventing or retarding epithelialization. We have used this compound, both preoperatively and immediately after the operation, as an initial dressing on the split thickness graft without any untoward effect. It has been used on most portions of the body, including the face.

REPORT OF CASE

Mrs. M. P., a patient with a Marjolin ulcer that developed in an infected laceration of a cicatricial contracture of the axilla, was admitted to the hospital on March 31, 1947. A scar had been present for forty-one years; infection had been present and progressive for ten years. All attempts at controlling the infection and at skin grafting had failed. The infection was brought under control within a week of application of nitrofurazone, which permitted block dissection of the axilla, the lateral thoracic wall, and the upper inner aspect of the arm. The lesion measured 4 by 5 cm. on the humeral side and 19 cm. from the axilla down the lateral thoracic wall. Metastasis had occurred to 1 of 4 lymph nodes removed in the dissection.

Attempts at skin grafting were made immediately after the block dissection but resulted in a poor "take" because of infection. Penicillin ointment had been used in an attempt to control the infection postoperatively. At the second attempt at grafting nitrofuran compound was left on the wound, to be removed at operation. The wound was prepared by washing the compound off with warm physiologic solution of sodium chloride. Nitrofurazone was reapplied immediately after the grafts were sutured in place, directly on the graft. A better than 90 per cent "take" was recorded, without infection of the wound.

TECHNIC

The following procedure is recommended: A fine mesh gauze is placed in a metal "boat" to be sterilized at 15 pounds (6.8 Kg.) of pressure for fifteen minutes. Strips of impregnated gauze are placed directly over the graft. Since 5-nitro-2-furaldehyde semicarbazone ointment becomes a liquid at body temperature, the gauze should be covered by a layer of petrolatum gauze to prevent its absorption by the dressing. It will then not be necessary to change the dressing daily as suggested by Curtis[5] in his directions for the use of "greaseless ointments." We have since used strips of nylon instead of fine mesh gauze, which we obtain from discarded Air Force parachutes.

SUMMARY

A case of Marjolin ulcer with metastases, treated by radical excision and skin grafting, is presented. The author states that Furacin

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Submitted for publication April 8, 1950.

[*] A 2 per cent ointment in a water-soluble base, supplied as Furacin Soluble Dressing by Eaton Laboratories, Inc., Norwich, N. Y.

Soluble Dressing (Nitrofurazone N N R) can be left on the wound to be grafted, washed off at operation in the preparation of the field with water or saline solution and reapplied directly on the graft as an initial dressing without retarding epithelialization or the "take" of the graft

RÉSUMÉ

Un cas d'ulcére de Marjolin avec métastases traité par excision radicale et greffe cutanee est présenté La préparation de Furacin soluble (Nitrofurazone N N R) fut employée avec succès L'auteur déclare que cette preparation peut être laissée sur la plaie où le greffon est appliqué, enlevée par lavage pour l'operation durant la préparation du champ opératoire avec de l'eau ou de la solution saline et appliquée de nouveau directement sur le greffon et tant que premiere couche du bandage, sans qu'elle retarde l'épithelization ou la "prise' de la greffe

RIASSUNTO

Riporta un caso di ulcera di Marjolin con metastasi curato con un'escisione radicale e con trapianti cutanei L'A ha usato con successo l'applicazione locale di Furacin (Nitrofurazone N N R) Questo medicamento puo' essere lasciato sopra la lesione prima dell'operazione lavato via con acqua o con soluzione salina al momento dell'operazione riapplicato direttamente sopra il trapianto cutaneo senza ritardare l'epitelializzazione o compromettere l'attecchimento del trapianto stesso

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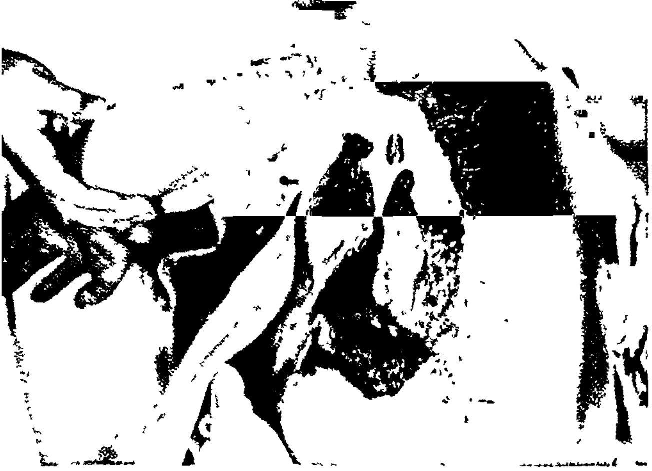

Fig. 5.

19 days after radical excision and primary graft. Ready for secondary grafting. Note poor "take" following primary graft due to postoperative infection uncontrolled by penicillin ointment.

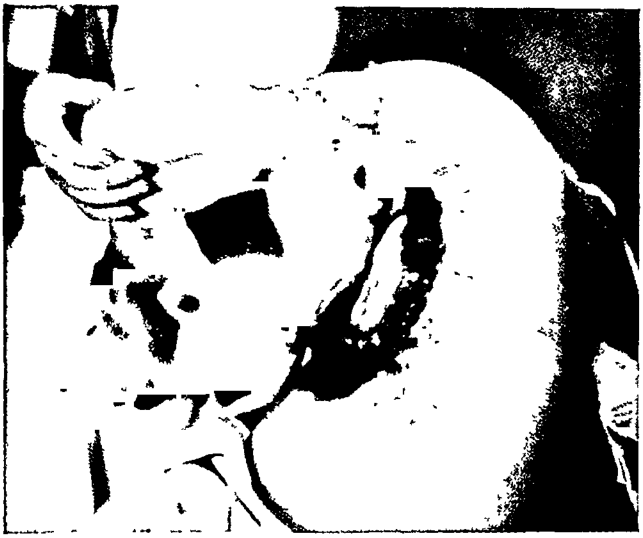

Fig. 6.

Note extensive dissection of axilla, two islands of "take" and healthy granulation tissue after Furacin therapy.

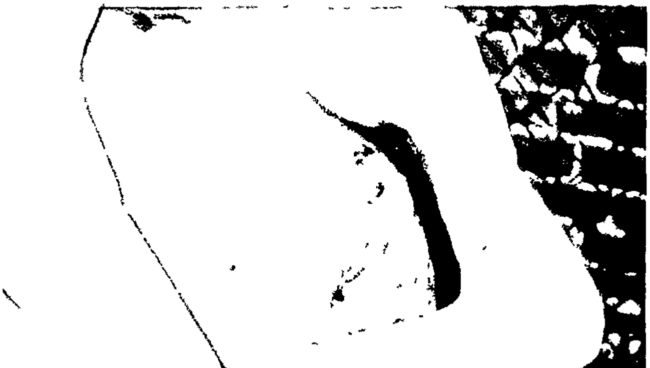

Fig. 7.

10 days after secondary graft. Note excellent "take" of free graft and breast flap.

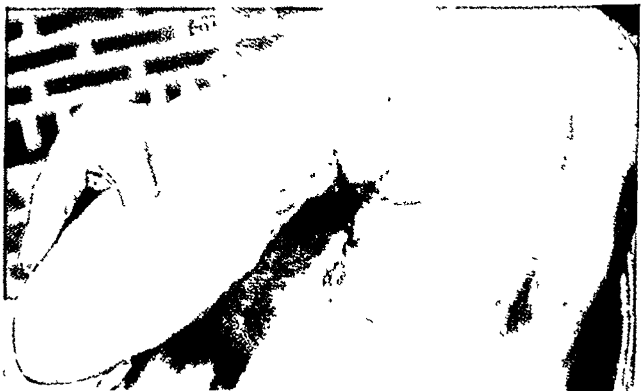

Fig. 8.

Posterior view after secondary split-thickness graft. Note excellent "take" and absence of infection.

the hip joint, angulation necessitated immobilization to permit union at the site of osteotomy At that time there was no method of reconciling these contradictory indications and, until a satisfactory method could be found of combining mobilization of the femur with firm fixation of the osteotomized fragments, no further progress seemed possible It was not until the Blount Moore nail was presented to the profession in 1943 that a logical development from the old operation to a one stage procedure was conceivable In 1946 the one stage operation was used for the first time[4] Since then, with modifications it has been the method of choice

Before operation a roentgenogram of the whole pelvis is measured to determine the angle of inclination of the pelvic wall Though this averages about 205 degrees it may be as small as 180 or as large as 225 degrees If a flexion deformity of the hips is present the roentgenogram must be made with the hips in flexion, otherwise tilting of the pelvis and illusory increase in the angle of inclination of the pelvic wall will appear The site of the proposed femoral osteotomy is determined and at this level the postosteotomy angle equal to the previously determined angle of inclination of the pelvic wall is marked upon the roentgenogram This step is fundamental in the proper conduct of the operation and a correct determination of the postosteotomy angle is considered indispensable A Blount Moore nail with the blade "curved on the flat is bent to equal the postosteotomy angle

Normally this angle will be in the neighborhood of 205 to 210 degrees If it is desired to compensate for shortening, this value may be increased by as much as 20 or 25 degrees Any increase beyond this will lead to an intolerable tilting of the trunk It must, however, be recognized that it is perfectly valueless to prescribe by rote the degree of abduction that should be undertaken in any given case The degree of angulation will vary with many factors such as the inclination of the pelvic wall, the amount of shortening already present the length of the femoral neck and the level at which osteotomy is to be performed As a consequence of this every case must be completely individualized Not only the angulation but the site of angulation which is equally important must be determined separately for each side even of the same pelvis Failure to pay strict attention to this detail will be rewarded by entirely unnecessary complications If the angulation is too small, instability and persistent disparity in length will result If, on the contrary, the angulation is too large, pain limitation of motion and a reversal of the disparity in length may confidently be expected The pelvic support osteotomy exerts a powerful lever action on the pelvis, and its kinetic action can be properly controlled only by application of the postosteotomy angle

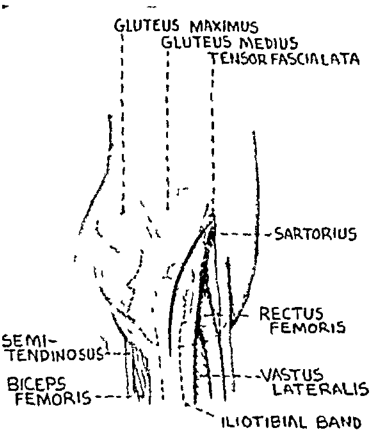

Fig 1 —Relation of the cutaneous incision to the underlying structures about the hip

TECHNIC

The operation itself is conducted with the patient under general anesthesia and in the supine position The lateral iliofemoral (so called Watson Jones) incision is preferred to the previously used anteroiliofemoral (so called Smith Petersen) incision The incision differs somewhat from that usually described, in that it extends from the anterior superior spine of the ilium downward beyond the tip of the great trochanter to the midpoint of the lateral aspect of the femur (Fig 1) From this point the incision may be continued down

The Resection-Angulation Operation for Arthritis and Ankylosis of the Hip

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THE recent announcement of the value of "Compound E" in the treatment of rheumatoid arthritis presages a period in which great advantage in the prophylaxis and therapy of disabling infections of the joints may be expected. There will, however, remain a large group in which the etiologic factor is not rheumatoid or in which the process has gone beyond the point at which any medical approach is of value. Among these will be arthritis resulting from other types of infection, from injuries (such as old or ununited fractures of the femoral neck or the acetabulum) and from articular incongruities, the sequelae of Perthes' disease, epiphysiolysis, malum coxae senilis and many other conditions. In these the syndrome will be dominated, as always, by pain and limitation of motion. In default of successful conservative therapy, recourse must be had to surgical intervention.

The surgical problems presented both by the painful and by the ankylosed hip have been approached by methods ranging from fusion to its exact opposite, arthroplasty. All have their specific indications and their peculiar drawbacks. Each has appealed to some group of surgeons, but not one has appealed to all.

In 1943 a new two-stage operative procedure for the treatment of ankylosis of the hip joint was reported. This procedure was first employed in 1934 and was later used in about 8 cases. It was based essentially upon (*a*) restoration of motion by resection of the femoral head and neck and (*b*) reestablishment of stability by the creation of an abduction osteotomy. At the time it was observed that this combination afforded an opportunity of satisfying both primary requirements of hip function—stability and mobility—and could be employed under circumstances in which the classic types of arthroplasty could not. The operation was relatively free of shock and could be carried out at intervals requiring relatively short periods of hospitalization.

In the beginning there was some uncertainty as to which of two procedures, resection or osteotomy, should be performed as the preliminary step. It was finally decided to do the osteotomy first, because this minimized the danger of upward displacement and because it eliminated the necessity for immobilization after resection of the femoral head.

The principle of resection of the femoral head and neck seems to have occurred to other surgeons, notably Girdlestone in England. In 1945 Batchelor,[2] following a suggestion made by Girdlestone in 1938, resected the femoral head and neck for ankylosis of both hips. The after-treatment consisted of traction for two or three months. To avoid instability in the cases of bilateral ankylosis a low Schanz type osteotomy was performed six to eight weeks after excision of the femoral head and neck.

In 1948 Batchelor[3] reported on a larger series of cases and again advocated primary resection. He stated: "This procedure has one serious disadvantage, the potential instability of the pseudo-arthrosis. This instability can be overcome to a certain extent by the use of a caliper for some months or more effectively by a low subtrochanteric osteotomy of the Schanz type. Osteotomy is particularly indicated when the patient is young and active. Osteotomy is contraindicated for elderly patients with bilateral degenerative osteoarthritis. The osteotomy can be carried out as a primary procedure at the time of the excision but preferably as a secondary procedure three to five weeks later, when the first incision has soundly healed."

Though the two-stage resection-angulation operation seemed a new and hopeful attempt at solution of the hip problem, it was far from ideal. Its inherent weakness lay in the fact that, while resection necessitated mobilization to maintain the range of motion restored to

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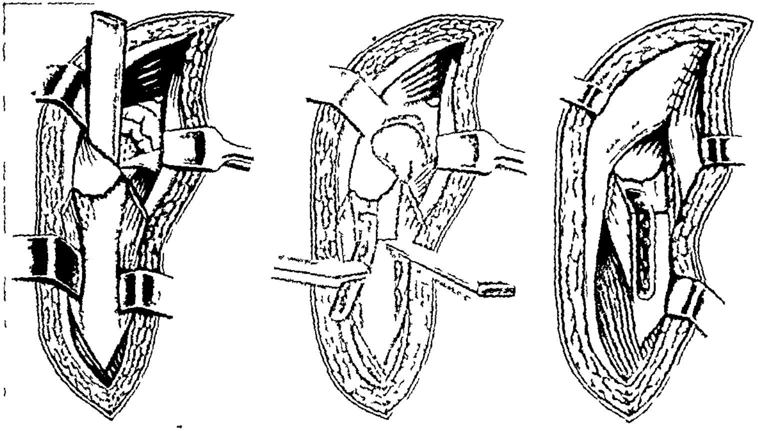

Fig 3 —*Left,* capsule opened The femoral neck is being divided at its base After acetabuloplasty head and neck are removed in one piece *Center* capsule sutured over the raw end of the neck The angulated nail has been inserted into the base of the trochanter The Lowman clamp has been applied to the femur and the angulated plate Osteotomy of the shaft is begun *Right* distal portion of the femur has been abducted and fixed to the angulated plate The wound is closed in layers

is placed in neutral or slightly internally rotated position so that the Blount nail will lie directly on the lateral aspect of the femur insuring a true abduction type of angulation osteotomy The curved blade of the nail is driven into the great trochanter so that no part of the plate can impinge upon the pelvic wall (Experience has demonstrated that postoperative pain and limitation of motion may be due to the projection of the blade or a screw against the pelvic wall The use of the curved blade affords firm fixation and obviates the need of any fixation screw on the upper fragment) The blade part of the nail is now fixed in the upper fragment with the plate part of the nail angulated away from the femur (Fig 3C)

The point at which the angulation occurs is marked on the femoral shaft and the site of osteotomy is prepared by drilling holes through the cortex at this level Two self retaining (Lowman) clamps are applied so as to hold both the plate and the Blount nail as well as the bone in a moderately firm grasp

The bone is osteotomized with a sharp osteotome and the clamps are screwed tight so that the distal osteotomized fragment of the femur is abducted to the surface of the angulated plate When this has been completed the plate is fixed with bone screws and the clamps are removed The wound is closed in layers without drainage A firm pressure bandage is applied to prevent hemorrhage Before the patient leaves the operating room a winged plaster of paris boot is applied to prevent rotation of the limb

As soon as the patient is able and in any event within a week passive motion of the limb is begun with the aid of a sling and an overhead pulley At the end of two or three weeks the patient may be permitted out of bed in a wheel chair At this time ambulation (without weight bearing) may be attempted In several instances weight bearing with the aid of crutches was successfully undertaken at the end of three weeks Generally speaking, it is probably safer to interdict weight bearing even with the aid of crutches for five or six weeks after operation Thereafter the patient may be given physiotherapy Under all circumstances the range of motion, especially flexion must be maintained Experience has ward along the lateral aspect for any desired distance. After the skin flaps have been reflected the fascia is divided in the line of the cutaneous incision. The interval between the tensor fascia femoris and the anterior fibers of the gluteus medius muscle is sought, and the muscles are bluntly separated (Fig. 2*A*). The tensor fascia femoris is retracted forward; the gluteus medius and minimus are retracted backward. This exposes the anterior-superior surface of the capsule of the hip joint with the reflected head of the rectus femoris at the upper angle of the wound (Fig. 2*B*). These muscle fibers are retracted and the capsule is opened by a cruciform incision close to the acetabular rim of the joint. The capsular flaps are reflected and the femoral head and neck are exposed by retractors (Fig. 3*A*).

If the head is too solidly united to the pelvis by bone, it may be separated from the neck by osteotomy flush with the pelvic wall. If the head can be dislocated from the acetabular cavity by means of a gouge or a skid, the leg is adducted and externally rotated to dislocate the head. (Though this materially facilitates the rest of the operation, it may prove to be the most difficult part.) Not infrequently resection of the overhanging osteophytic acetabular margin is necessary to effect release of the head. Occasionally, especially in secondary operations, it may be necessary to remove the head by morcellation. Once the head is released, the leg is externally rotated so that the whole femoral neck may be readily visualized (Fig. 3*B*).

With a broad sharp osteotome the neck is transected through its base and the whole neck, together with the head, is removed. The two outer flaps of the capsule are then pulled over the raw area at the base of the neck and sutured to the posterior capsular wall. The muscles are approximated, and the fascia over the upper part of the wound is closed.

The lateral incision is now extended, the fascia lata is opened and the vastus lateralis is subperiosteally stripped from its attachment to the upper end of the femur. The base of the trochanter is defined, and the previously determined point of entrance of the angulated nail is marked on the bone. The leg

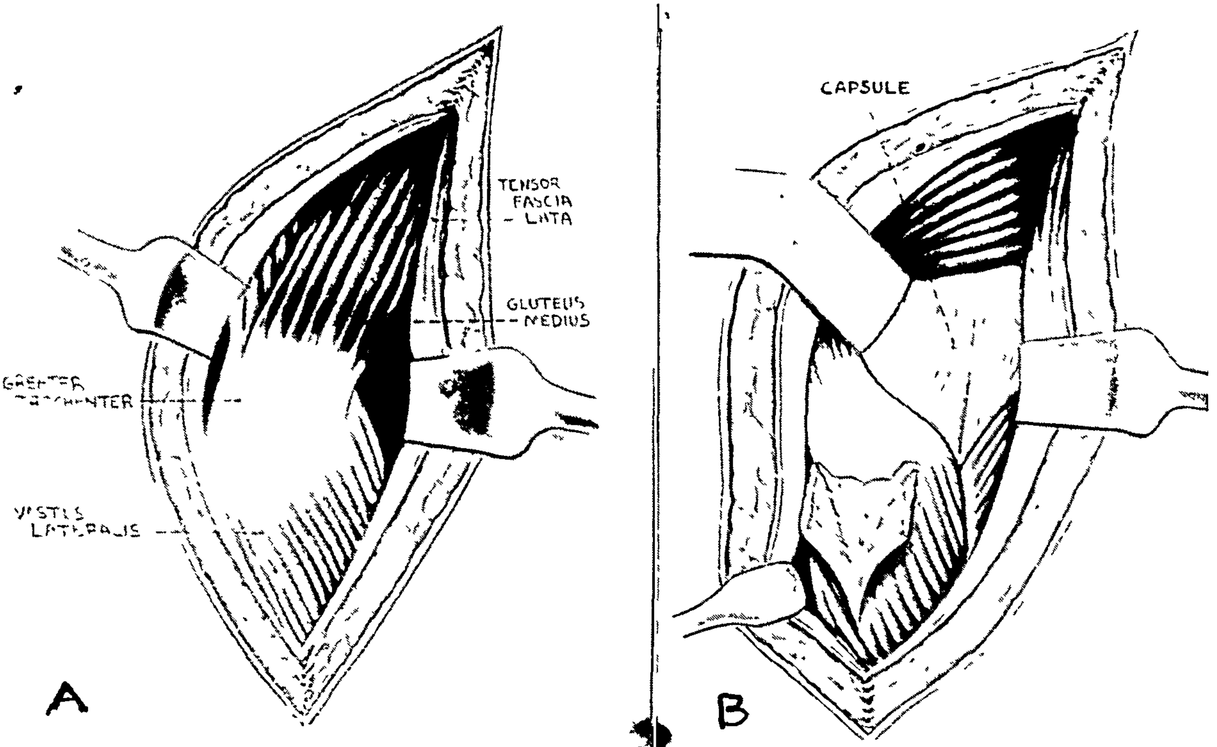

Fig. 2.—*A*, space between the tenor fascia femoris and the gluteus medius muscle indicated at the beginning of the capsular exposure. *B*, capsule is exposed in the interval between the gluteus medius and the tensor fascia femoris.

should be paid to increasing and maintaining the range of flexion Despite the extensive resection, immobilization or limitation of motion for even a short time leads to a marked restriction of motion due to fibrosis around the joint This of course, completely vitiates the results of the operation Even in the absence of any rotation the preservation of flexion permits a satisfactory range of function Provided flexion is preserved these patients will be able to live fairly normal lives If flexion is unavoidably lost it should be restored by manipulation, with the patient under anesthesia if necessary

Because of the relative lengthening and consequent insufficiency of the periarticular musculature, definite end results cannot be expected for some months after operation Once the muscles have become adapted to their new mechanical conditions, the power of active flexion of the hip will return if the muscles are adequate It must be realized, however that the object of the operation is merely reestablishment of the mechanical conditions necessary for motion As with every joint releasing operation, this alone affords no assurance of the adequacy of motor power If motor power has been irretrievably lost, the operation cannot offer more than the prospect of passive flexion Unsatisfactory though it may be, even this is desirable, and the patients are extremely happy to be able to sit down like other human beings

If the musculature recovers and in proportion to the degree of recovery, the limp due to weakness of the gluteus muscle tends to disappear and the gait may improve to such an extent that the limp is not obtrusive It may be made still less noticeable by compensating the shortening with an appropriate elevation of the shoe In patients with bilateral conditions the bilateral operation will tend to eliminate disparity in length and so to minimize the limp

Though a final decision must be deferred it would seem to be a distinct error to fuse one hip and perform a resection angulation operation on the other, it seems obvious that the fused hip will be just as likely to cause lumbosacral symptoms as it is when the opposite hip is normal Unless special attention is given to avoid excessive abduction of the fused hip, the disparity in length resulting from the resection may be increased by the abduction of the fixed hip Even more important, the fixed abduction of the fused hip tends to destroy the stability of the resected hip

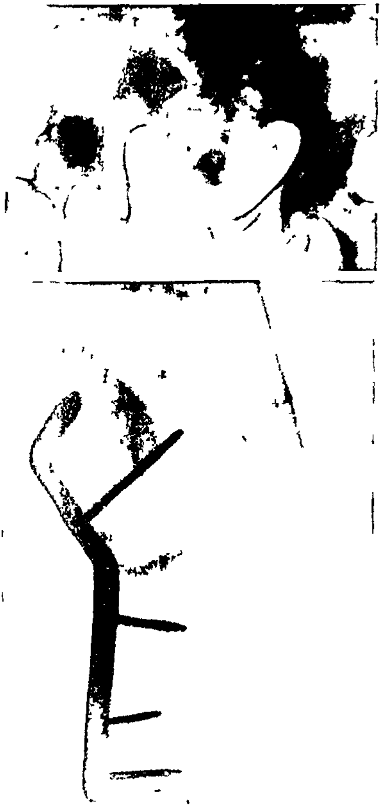

Fig 4 — *Above*, roentgenogram of the pelvis before operation The right hip joint is narrowed and its surfaces sclerosed *Below*, roentgenogram taken four months after operation The patient has returned to his normal work

The stability of the pelvis after angulation demonstrated that a successful outcome depends upon retention of maximal flexion. This may be assured by traction, bending exercises and pedal exercises on a stationary bicycle.

REPORT OF CASE

Gustave S., a painter 45 years old, was first seen in December 1948. He stated that in 1929 he had fallen off a scaffold, injuring his right hip, and that nothing was done about the condition at the time. In 1937 he noticed stiffness and pain, which became markedly worse on change of weather. A roentgenogram revealed definite osteoarthritis of the hip, and a fusion operation was advised. This the patient refused. With the lapse of time, however, the condition became progressively worse, so that the patient was unable to work or even to stand without excruciating pain.

At his first examination it was noted that the patient walked with a marked limp and constantly complained of pain in the right hip. He was, of course, unable to walk upstairs or to put on his shoes and stockings in a normal manner. There was a flexion deformity of about 15 degrees (pelvifemoral angle 65 degrees). The right thigh could be extended to about 165 degrees and flexed to about 120. There was no rotation and no abduction beyond the neutral position. Motion in the left hip was normal. There was about ½ inch (1.2 cm.) shortening (RA 37½ inches, LA 38 inches). The roentgenogram (Fig. 4) showed a typical deformity of the femoral head with narrowing of the joint space.

The patient was advised to submit to the resection-angulation operation and consented to its performance on Dec. 13, 1948. Cyclopropane anesthesia was employed. The hip joint was approached through a lateral iliofemoral incision, and a deformed femoral head and a deformed and shortened femoral neck were observed. Because of the marked overhang of the acetabular edge, the eburnated projecting portion of the acetabulum was excised. Though this exposed the greater part of the head, it was still impossible to dislocate the enlarged, deformed and ankylosed head. The femoral neck was thereupon transected at its base and the head was removed by morcellation. The capsular flaps were sutured together over the roughened area of the neck, and the fascia was closed.

The incision was extended, and the upper fourth of the femur was subperiosteally exposed from the great trochanter downward. The blade part of the previously angulated Blount-Moore nail was inserted into the femur at a point just below the base of the great trochanter. The site of osteotomy was drilled and then cut through to permit angulation of the distal fragment, which was firmly fixed against the metal plate. After fixation of the plate the wound was flushed with penicillin and closed in layers without drainage. A firm pressure bandage was applied and a winged plaster of paris boot was moulded to prevent rotation.

The postoperative reaction was mild, and convalescence was uneventful. At the end of the first week passive motion by means of an overhead pulley and a sling was begun. At the end of the third week the patient was permitted out of bed in a wheel chair, and within a few days he was allowed to try walking with the aid of crutches. The shortening had been increased to about 1 inch (2.5 cm.).

On Jan. 29, 1949, a little more than six weeks after the operation, he began to bear weight with the aid of a cane. He described a peculiar sensation as of "walking on a ball." He complained of only slight pain on weight bearing. Actively the leg could be flexed through an arc of 40 degrees, passively through an arc of 80 (AGE 180 degrees, AGF 100 degrees). Passive abduction was possible to 25 degrees, internal rotation to 15, external rotation to 20. Though the roentgenogram (Fig. 5) showed that the osteotomy was not completely healed, the patient had no difficulty in using his leg and was able to walk upstairs in an approximately normal manner.

The patient was advised to begin bicycle exercises. He continued to make gradual improvement, and when examined on April 9, sixteen weeks after the operation, he was able actively to flex the extended leg to 100 degrees. He noted slight discomfort and some pain only after prolonged walking. He walked up and down stairs without any difficulty. He could put on his shoes in an almost normal manner, and with a lift under the right shoe his limp was barely perceptible. He insisted on returning to his work as a painter and a week later reported that he had been able to perform it as usual without difficulty. Since that time the patient has continued normally at work. He has lost no time and has complained of slight pain only after prolonged exertion or change of weather.

COMMENT

This case is fairly typical. In some instances the results have been unsatisfactory in that pain has persisted; but on the whole the patients have been pleased with the operation. As experience accumulates, a number of important details have come to attention, of which the most important is preservation of the flexion obtained at operation.

After the operation, particular attention

The Use of Anticoagulants in Small Hospitals

MANDEL WEINSTEIN, M.D. AND MORTON ROBERTS, M.D.
LONG ISLAND CITY, NEW YORK

THE presence of an increasing number of thromboembolic venous and arterial complications in surgical patients merits reevaluation of current methods of managing this problem. The increase in the number of such cases may be due to the wide use of antibiotics, as mentioned by Ochsner[1] and others, or to the fact that an increased number of patients who survive major operations *may develop phlebothrombosis (Allen[2]). The* fact that the incidence of thrombosis is increasing may also be partly attributed to the undisputed fact that more diagnoses of this condition are being made now than formerly. On the whole we might say that earlier recognition of the disease is being made because of the greater understanding of its pathology and course in addition to the many facilities now available for diagnosis. Operations on the aged are also becoming more common; this adds another class of patient in whom the likelihood of thrombosis is great. Patients with trauma to the lower extremities, those with abdominal malignant disease, those with cardiac disturbances are particularly vulnerable to thrombosis and embolism.

This study is a review of the different methods of treating thromboembolic venous and arterial diseases as they occur in a general surgical practice, with particular emphasis upon the methods of treatment which are simplest and easiest to use. We propose to show that surgeons and internists in small institutions where specialized laboratory procedures are unavailable may utilize these simple methods and controls.

Obviously, if it were possible for all these patients to be treated by members of the resident and attending surgical staffs without calling upon the specialized hospital services, uniformity of procedure could be more easily achieved and a greater number of patients treated. Not only is a knowledge of preoperative and postoperative care essential if one is to obtain the best results in surgery, but the ability of the surgeon himself to prevent, diagnose and treat surgical complications will help to insure postoperative recovery. Today's progressive training equips the surgeon with more than the mere technical ability to perform various operations. An example of this surgical progress can be found in the present day management of surgical conditions in *diabetic patients. The surgeon's interest in* diabetes and his understanding of the condition have supplemented the excellent contributions made by medical diabetic specialists.

Exceptional credit is due to such pioneers of modern surgery as Allen, Ochsner and Homans for their progressive scientific approach to the problem of pulmonary infarction. Instead of concentrating their efforts upon the improvement of surgical procedures for removing the clot in the chest by the Trendelenburg operation, which carries a pitifully low survival rate, they have directed attention to the causes and nature of clot formation. Emphasis has been placed upon the precursor of the deadly pulmonary infarct—the clotted vein of the lower extremity. From the early results of these investigations has evolved the surgical procedure of bilateral interruption of the superficial femoral vein to insure isolation of the clotted vein within the lower extremity. *However, there have been differences of opinion* as to the exact level of ligation and the amount of postoperative swelling that results from different procedures, and despite all efforts pulmonary infarction has still occurred. More recently certain workers followed interruption of the vein with anticoagulation therapy in the belief that a postoperative clot may form on either side of the interrupted vein and become a grave hazard. Surgical procedures have failed to solve the whole problem of surgical thrombo-embolic venous complications, so that treatment at present, with a few exceptions, tends toward anticoagulation therapy.

In our opinion, even when sectioning of the vein has been accomplished, anticoagulation

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[illegible] Surgical Service, [illegible] Boulevard Hospital [illegible] Submitted for publication [illegible] 195[illegible] osteotomy depends entirely upon the fact that the pelvis tilts downward and rests upon the side of the upper femoral fragment. The angulation which the fragment makes with the distal portion of the osteotomized femur is identical with the angle made by the pelvic wall with a perpendicular to the ground. Any factor that tends to elevate the pelvic wall diminishes this angle and so tends to minimize stability and cause pain, owing to the incongruity between the pelvic wall and the angulated femur. Because of the downward inclination of the pelvic wall on the fused side, the angle of inclination of the pelvic wall on the movable side is reduced, so that it affords no surface against which the pelvic support osteotomy can find a stable abutment. It is clear that, when the angle made by the wall of the pelvis with the perpendicular is reduced to below 180 degrees, stability must be lost.

SUMMARY

The author describes and recommends a resection-angulation procedure for arthritis and ankylosis of the hip. A typical case is reported in detail. The resection-angulation operation has been performed for osteoarthritis of the hip, congenital hip dislocations, and fracture of the femoral neck with arthritis or ischemic necrosis of the femoral head, and is suitable for any condition characterized by pain due to arthrogenic limitation of motion. It has been employed with patients ranging from 16 to 77 years of age. The results have been extremely encouraging; there is comparative little shock, and the patients are able to walk in less than six weeks.

RESUMEN

El autor describe y recomienda un procedimiento de resección -angulación para la artritis y anquilosis de la cadera. Se comunica detalladamente un caso típico. La operación de resección-angulación se ha realizado en la ósteartritis de la cadera, luxaciones congénitas de la cadera, fractura del cuello femoral con artritis o necrosis isquémica de la cabeza femoral, siendo adecuada para cualquier estado caracterizado por dolor causado por limitación artrogénica del movimiento. Se ha empleado en pacientes de 16 a 77 años de edad. Los resultados han sido muy alentadores; habiéndose presentado muy poco shock, y pudiendo caminar los pacientes en menos de seis semanas.

RÉSUMÉ

L'auteur décrit et recommande l'intervention résection angulation pour l'arthrite et l'ankylose de la hanche. Un cas typique est présenté en détail. L'opération de la résection angulation est exécutée pour l'ostéoarthrite de la hanche, les luxations congénitales de la hanche, les fractures du col du fémur avec arthrite ou nécrose ischémique de la tête fémorale, et convient à tous les cas caractérisés par la douleur dûe à la limitation de mouvement d'origine arthrogénique. On a fait subir cette opération à des malades dont l'âge variait de 16 à 77 ans. Les résultats en ont été extrêmement encourageants. Il n' y a eu que relativement peu de choc et les malades reprirent la marche en moins de six semaines.

RIASSUNTO

L'A. propone e raccomanda un metodo operativo di resezione—angolazione per artrite ed anchilosi dell'anca. Riporta in dettaglio un tipico caso del genere.

L'operazione puo'essere eseguita per osteoartrite, dislocazione congenita dell'anca, frattura del collo femorale con artrite o necrosi ischemica della testa femorale: si presta per ogni sindrome dolorosa da limitazione artrogenica dei movimenti. I risultati sono stati estremamente incoraggianti in soggetti da 16 a 77 anni; raro e lieve lo shock; i pazienti sono capaci di camminare in meno di 6 settimane dall'operazione.

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The Use of Anticoagulants in Small Hospitals

MANDEL WEINSTEIN, M D AND MORTON ROBERTS, M D
LONG ISLAND CITY, NEW YORK

THE presence of an increasing number of thromboembolic venous and arterial complications in surgical patients merits a revaluation of current methods of managing this problem The increase in the number of such cases may be due to the wide use of antibiotics, as mentioned by Ochsner[1] and others[2] or to the fact that an increased number of patients who survive major operations may develop phlebothrombosis (Allen The fact that the incidence of thrombosis is increasing may also be partly attributed to the undisputed fact that more diagnoses of this condition are being made now than formerly On the whole we might say that earlier recognition of the disease is being made because of the greater understanding of its pathology and course in addition to the many facilities now available for diagnosis Operations on the aged are also becoming more common this adds another class of patient in whom the likelihood of thrombosis is great Patients with trauma to the lower extremities those with abdominal malignant disease those with cardiac disturbances are particularly vulnerable to thrombosis and embolism

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From the Surgical Service Boulevard Hospital
Submitted for publication March 6 1950

therapy should be used postoperatively in all these cases (unless contraindicated) and surgical venous interruptions should be reserved for: (1) patients with pulmonary infarction when the disease is first detected; (2) patients in whom pulmonary infarction develops in spite of anticoagulation therapy, and (3) patients for whom anticoagulants are contraindicated by active bleeding, potentially hemorrhagic lesions, hemorrhagic blood dyscrasias, increased capillary fragility or suspected intracranial hemorrhage.

ANTICOAGULANT DRUGS

Heparin and dicumarol are at present the basic anticoagulants. We have used both. However, of late, heparin in Pitkin's menstruum has become our anticoagulant of choice. The reason for this selection will become apparent in the following discussion.

Heparin.—McLean,[4] one of Howell's collaborators, was the first to discover heparin and to observe its antagonistic effect on clot formation. Charles and Scott[5] purified this substance. Its action on experimental animals was determined by Murray, Best, Jacques and Perrett.[6] Murray and Best,[7] stimulated by the chemical researches of Jorpes,[8] began using heparin in the treatment of thrombophlebitis and nonfatal pulmonary embolism. Their work established its efficacy.

Heparin should be administered intravenously in approximate doses of 50 mg. every four hours (venocylsis or injection). The pharmacologic effect is immediate, and no additional doses should be given unless determinations of the coagulation time have first been made. Recently some workers have been using heparin intramuscularly, but we have had no experience with this method of administration. Treatment with intravenous heparin exclusively throughout the course of thrombo-embolic venous and arterial disease requires frequent injections and the constant attendance of medical personnel. In addition, these frequent injections are disturbing and costly to the patient. The usual optimum pharmacologic effect of heparin is reached when there is a coagulation time ranging between twenty-five and sixty minutes by the Lee-White Method (normal, nine to fifteen minutes). To counteract or retard heparinization, whole blood is given. Not only is the coagulation time shortened, but the whole blood serves as replacement for any blood lost. The advantages are as follows:

1. Immediate effect.
2. Relative nontoxicity.
3. No oral administration (a decided advantage for very ill patients who vomit postoperatively and have Levine and Miller-Abbott tubes for intestinal decompression).
4. Simple coagulation time determination (Lee-White method; the test may be performed on the surgical floor and no technician is needed).

The disadvantages of heparin treatment may be listed thus:

1. Necessity for injections every four hours.
2. Determination of coagulation time needed every four hours, prior to each administration.
3. Expense.

Dicumarol.—This anticoagulant was discovered and synthesized by Link.[9] Its prophylactic use was suggested by Allen and his coworkers.[10] The danger from hemorrhage in a patient treated with dicumarol cannot be too strongly stressed. Such hemorrhage may occur not only in the operative wound but elsewhere, e.g., in the brain. Some patients are particularly sensitive to the drug, while others are refractory to its pharmacologic effect. The present method of control tests may not be sufficiently reliable, since patients receive some protection even though there is no apparent change in the prothrombin level. Dicumarol should never be used unless accurate prothrombin determinations accompany its administration. It is usually given concomitantly with heparin, since it takes thirty-six to forty-eight hours to produce its therapeutic effect. On the first day one usually gives 300 mg.; on the second day, 200 mg. On the third day, if there has been no undue elevation in the prothrombin time, another 100 mg. is given. Thereafter, dicumarol is given as needed, with emphasis upon careful checking of the prothrombin time. An attempt is made to maintain a prothrombin level approximately 12.5 per cent of the norm. The therapeutic range is between 10 and 20 per cent. To prevent hemorrhage, if the prothrombin time has been elevated to a dangerous level and no bleeding is detected, 10 to 20 mg. of vitamin K should be given hypodermically to lower the prothrombin time. To a patient treated with dicumarol and already bleeding 70 mg. of vitamin K should be given immediately to reduce the prothrombin time. Whole blood may be administered at the same time (replacement therapy).

The advantages of dicumarol consist in

1. Oral administration
2. Moderate cost

The disadvantages are

1. It cannot be given postoperatively to patients who are nauseated, have attacks of vomiting or require intestinal decompression.
2. A daily determination of prothrombin time is required, an elaborate and expensive procedure which must be done by well trained technicians.
3. The drug has toxic effects.

Heparin Pitkin's Menstruum.—Credit is due to Loewe[11] for presenting the use of heparin in Pitkin's menstruum, a preparation of various amounts of heparin sodium salt with or without vasoconstrictor drugs dissolved in the Pitkin menstruum.* Administered as a deep subcutaneous injection, its action lasts for forty eight hours or more. Like heparin alone, heparin in Pitkin menstruum is relatively safe, and the effect of the heparinization is determined by a simple coagulation test (a modification of the Lee White/Howell method). Heparin in Pitkin's menstruum may be used to initiate dicumarol therapy to cover the lag period (thirty six to forty eight hours) during which dicumarol is building up its therapeutic effect.

An initial dose of 300 mg. we have found is usually sufficient for the patient weighing up to 150 pounds (68 Kg.).† Over this weight 400 mg. is required. If heparin in combination with the vasoconstrictor drugs is not contraindicated, and the calculated dose is 400 mg., we give 200 mg. of heparin with vasoconstrictors and 200 mg. without vasoconstrictors.

The advantages of this form of therapy are

1. Its immediate effect
2. The fact that it is relatively nontoxic
3. Its subcutaneous administration once every forty eight hours
4. Its special suitability for patients who are postoperatively nauseated, subject to vomiting or undergoing gastrointestinal decompression
5. The simple coagulation time determination (modification of Lee White/Howell method performed every twelve to fourteen hours during the first forty eight to seventy two and subsequently once every 48 hours, may be done at bedside, no technician needed
6. The fact that it is used alone throughout the treatment
7. Its usefulness in initiating dicumarol treatment

The disadvantages are

1. Expense (though price is more reasonable than formerly)
2. Injection pain (minimal and can be prevented by *slow injection)*

LABORATORY CONTROLS DURING ANTICOAGULATION THERAPY

When a patient is given anticoagulation therapy, especially with dicumarol, a graph of the prothrombin and coagulation times with a plotted drug curve at the base may be helpful. Then after treatment is begun one may easily observe the results of the drug and be in a better position to determine the future dosage.

The prothrombin time determination is used only when dicumarol is given. It is performed daily in the hospital laboratory by trained technicians according to the Link Shapiro[12] modification of Quick's method. The procedure for the test is as follows

Preparation of Blood Samples

1. Place 0.5 ml. of 0.1 M sodium oxalate in tube for each sample
2. Add 4.5 ml. of blood rapidly to the oxalate solution
3. Centrifuge at 1,700 revolutions per minute
4. By means of a pipette, draw off the clear plasma to a test tube and save in refrigerator for later use

Preparation of Thromboplastin Suspension

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*The ingredients of the Pitkin menstruum are gelatin 18 to 30 per cent, dextrose 5 to 12 per cent, glacial acetic acid 0.5 per cent and the remainder distilled water.

†Current medical consensus is that 400 mg. as an initial dose may even give better results.

TABLE 1.—*Laboratory Data: Combination Anticoagulation Therapy (Heparin and Dicumarol)*

Anticoagulation therapy		Intravenous Heparin, mg.	Coagulation time, min.	Dicumarol, mg.	Prothrombin time, sec.	Control time, sec.
Days	Hours					
	0		10		(12.5%) 35 (whole) 19	17
		50		300		
	4		13			
		50				
	8		12			...
		50				
1	12		11			
		50				
	16		10			
		50				
	20		10			
		50				
	24		12			
		50		200	27	17
	28		11			
		50				
	32		13			
		50				
	36		12			
2		50				
	40		15			
		50				
	44		15			
		50				
	48					
3					46	17
4					43	16.5
5					38	16.5
6				50	34.5	16 5
7				100	33.5	16.5
8					37.5	16
9					37	16
10					35	16
11				50	32.5	16
12					35	16
13					32	16

1. Place 50 mg. of thromboplastin (Maltine) in 10 to 15 ml. test tube; add 2.5 ml. of 0.85 per cent sodium chloride and mix for about four minutes, using a thermometer as a stirring rod.
2. Heat at 57 C. (range 55-59 C.) for ten minutes in a water bath or incubator.
3. Cool test tube to 25 C. mixing contents while cooling.
4. Add 2.5 ml. calcium chloride (0.025 M.) and stir for about four minutes.
5. Centrifuge at 1,700 revolutions per minute for four minutes. Stop centrifuge slowly to avoid resuspending the flocculent precipitate.
6. With a pipette, draw off the slightly turbid supernatant into a clean, stoppered test tube. If kept in a refrigerator, this extract may be used for prothrombin determinations for a maximum of seventy-two hours.

Prothrombin Test:

1. Transfer (with a pipette) 0.2 ml. of the thromboplastin extract into each of three 100 by 12 mm. test tubes. This is sufficient for triplicate determinations of the prothrombin level on one dilution of plasma from one patient.
2. Place the three test tubes in a water bath maintained at 37 C. About three minutes is sufficient to bring the contents to the proper temperature.

3. Place a test tube containing the whole or diluted blood plasma to be tested in a water bath at 37 C.
4. With a micro (blood sugar) pipette, take 0.1 ml. of whole blood plasma (of 12.5 per cent dilution).
   a. Hold pipette just above liquid in one of the three tubes containing thromboplastin extract.
   b. Blow out pipette quickly to deliver contents, and at the same instant start stop watch (operated by pedal).
   c. Tap tube sharply to mix contents while tube is in water bath. Tube is kept in bath through rest of procedure.
   d. A No. 22 nichrome wire loop stirrer is moved in slow sweeps across the bottom of test tube and is viewed against a strong light set at an optimum angle.
   e. When clot adheres to wire loop press foot pedal of stop watch and record time.
   f. Repeat test with remaining 2 tubes of thromboplastin extract.

The prothrombin time of normal whole plasma is 15.5 ± 1.5 seconds; the prothrombin time of normal plasma at 12.5 per cent concentration is 39.5 ± 2.5 sec.

The effect of heparin is judged by and based on *determination of the blood coagulation* time. The Lee-White method is used to determine the anticoagulant effect. A modification of the Lee-White/Howell method[11] is used for heparin/Pitkin's menstruum. The tests are so simple that no trained laboratory technicians are needed. It may be done at the bedside or on the surgical floor.

The procedure *for the modified Lee-White/* Howell method of determining blood coagulation time is as follows:

1. Place four dry, chemically clean 75 by 10 mm. test tubes in a rack.
2. With a sterile dry syringe and needle, withdraw a little less than 2 cc. of venous blood from the heparinized patient.
3. Distribute a little more than 0.35 cc. of *blood into each test tube and allow the* tubes to stand until the test is completed.
4. *Time the test by stop watch from the moment the vein is "negotiated" to the time clotting is noted in the test tubes.* The normal values usually range from nine to fifteen minutes.

PREREQUISITES FOR ANTICOAGULATION THERAPY

Since blood under anticoagulation therapy is often difficult to type and cross-match, one must secure and store samples of the patient's blood and serum before treatment. Naturally, blood for emergency transfusion should always be available.

TABLE 2.—*Laboratory Data: Combination Anticoagulation Therapy (Heparin/Pitkin's Menstruum and Dicumarol)*

Anticoagulation therapy		Subcutaneous H/PM with vasoconstrictors mg	Coagulation time, min	Dicumarol, mg	Prothrombin time, sec	Control time, sec
Days	Hours					
					36 (12.5%)	
	0		12		15	12
		300		300		
1	12		27			
	24		28	200	17.5	12
2	36		25			
	48					
3				100	32	14
4					35	11
5					14	15
6				50	28	14
7				50	30	14
8					10	11
9					18	16
10				100	21	15
11				100	28	15
12					31	15

TABLE 3.—*Laboratory Data: Therapy with Heparin/Pitkin's Menstruum*

Anticoagulation therapy		Subcutaneous H/PM with vasoconstrictors,	Coagulation time,
Days	Hours	mg.	min.
	0		15
		300	
1	12		25
	24		30
2	48		26
		300	
3			35
		300	
5			29
		300	
7			33
		300	
9			34
		300	
11			32

Should there be any possibility of the future use of dicumarol, then, even before heparinization, one must ascertain the following values by tests:

a. Prothrombin time without dilution
b. Prothrombin time with 12.5 per cent dilution

These are essential because, should heparin be given as the initial drug for treatment, the true prothrombin values would be altered.

Venipuncture must be made cleanly; any amount of tissue juice in the blood sample will invalidate the determinations of coagulation or prothrombin time.

ILLUSTRATIVE CASES

CASE 1. *Therapy with Heparin and Dicumarol.*—M.M., a white woman aged 67, weighing 158 pounds (71.7 Kg.), who incidentally had diabetes and cardiac fibrillation, was admitted to the hospital nine days after an appendectomy because of pain, tenderness and swelling in the right calf. The patient was treated with heparin every four hours and with dicumarol. After ten days of anticoagulation therapy, she was permitted to walk about, and on the thirteenth day she was discharged.

CASE 2. *Therapy with Heparin/Pitkin's Menstruum and Dicumarol.*—W.N., a white man aged 35, weighing 150 pounds (68 Kg.), was admitted to the hospital for thrombophlebitis involving the left femoral vein, following trauma. Anticoagulation therapy was initiated; Heparin/Pitkin's menstruum was used with vasoconstrictors, followed and maintained by dicumarol. After eight days the patient was allowed out of bed. He was discharged on the twelfth day.

CASE 3. *Therapy with Heparin/Pitkin's Menstruum.*—L.M., a white man aged 72, weighing 149 pounds (67.6 Kg.), was admitted to the hospital for the radical removal of a carcinoma of the rectum. On the ninth postoperative day symptoms of thrombosis appeared in the right calf. The patient was treated every other day with heparin/Pitkin's menstruum with vasoconstrictors. After eight days of anticoagulation treatment he was allowed out of bed, and on the eleventh day he was discharged.

SUMMARY

1. Anticoagulation therapy is gradually replacing surgical procedures in the treatment of thromboembolic disease.

2. The increase in the number of patients with thromboembolic disease in general surgical practice necessitates simplification and standardization of anticoagulation therapy, particularly in small institutions.

3. Three anticoagulants are compared: Heparin elicits a quick response and is administered every four hours. Blood coagulation time is determined by a simple procedure (Lee-White Method). Dicumarol produces its therapeutic effect after thirty-six to forty-eight hours. Laboratory control tests of the prothrombin time must be performed daily throughout the period of administration of the drug. These tests are highly specialized and require the services of trained laboratory technicians. Patients on dicumarol therapy are continually in great danger; in the words of Allen,[3] "A long weekend with laboratories closed may prove disastrous."

Heparin/Pitkin's menstruum is a marked improvement over both heparin and dicumarol; it elicits an immediate effect and is usually administered once every forty-eight hours. Blood coagulation time is determined by a simple procedure (a modification of the Lee-White/Howell method). Heparin/Pitkin's menstruum [illegible] used as the sole agent for obtaining [illegible] anticoagulation effect or for ob[illegible]e anticoagul[illegible] sponse in [illegible] gulation

RÉSUMÉ

1 Les méthodes d'anticoagulation thérapeutique remplacent graduellement l'intervention chirurgicale pour le traitement des maladies de thrombo embolies

2 Le nombre de plus en plus élevé de malades à maladies de thrombo embolies dans la pratique chirurgicale générale exige l'établissement d'une méthode simplifiée et standardisée adaptee à la moyenne des cas demandant cette thérapeutique, particulièrement dans les petits hôpitaux et cliniques

3 Comparaison de trois agents anticoagulants *L'Héparine* provoque une prompte réponse de l'organisme et est administre toutes les quatre heures Le temps de coagulation est déterminé par un procédé simple, (methode Lee White) Le *Dicumarol* produit son effet thérapeutique entre la trente sixieme heure et la quarante huitieme heure Les tests de laboratoire quant à l'évaluation du temps prothrombine doivent être effectues journellement pendant tout le temps où le medicament est administre Ces tests demandent une haute spécialisation et requièrent les services de techniciens avertis Les malades recevant cette thérapeutique sont en danger continuels *D'aprés Allen "Une fin de semaine prolongee* durant laquelle les laboratoires sont fermes peut être fatale" *Le Menstruum Heparin Pitkin* offre des avantages marques sur l'heparine et le dicumarol Son effet est immédiat et son administration est limitée a une fois toutes les quarante huit heures Le temps de coagulation est determiné par un procédé simple la modification de la méthode Lee White Howell Cette preparation peut être employée comme agent unique pour obtenir un effet d'anticoagulation continu ou bien pour obtenir une réaction d'anticoagulation immediate en la combinant avec la thérapeutique d'anticoagulation

RIASSUNTO

1 La terapia medica anticoagulante sta gradatamente sostituendosi alla cura chirurgica delle *affezioni tromboemboliche*

2 L'aumento delle affezioni tromboemboliche nella pratica chirurgica in genere richiede una semplificazione ed una standardizzazione della terapia anticoagulante, specialmente nelle piccole cliniche

3 Un confronto viene stabilito fra le tre principali sostanze anticoagulanti

L'eparina determina una rapida risposta viene somministrata ogni 4 ore Il tempo di coagulazione viene misurato con un metodo relativamente semplice (Lee White)

Il Dicumarol provoca i suoi effetti dopo 36 48 ore La protrombina viene misurata giornalmente durante tutto il periodo di somministrazione I metodi di laboratorio sono molto delicati e richiedono un personale altamente specializzato I pazienti curati con Dicumarol sono continuamente in grave pericolo una lunga fine di settimana con chiusura dei laboratori puo riuscire disastrosa (Allen)

Eparina in soluzione di Pitkin segna un notevole progresso sull'eparina semplice o sul Dicumarol Viene somministrata generalmente ogni 48 ore la risposta e immediata Il tempo di coagulazione viene stabilito con un metodo molto semplice (una modificazione del metodo di *Lee White Howell*) Puo essere somministrata da sola quando si desideri un'azione anticoagulante continua oppure in combinazione con altre sostanze anticoagulanti quando s'imponga un effetto immediato

RESUMEN

1 La terapia de anticoagulacion esta reemplazando gradualmente los metodos quirurgicos en el tratamiento de la enfermedad tromboembolica

2 En el tratamiento de la enfermedad tromboembolica en la practica quirurgica general requiere que se simplifique y sistematice la terapia de anticoagulacion especialmente en las instituciones pequeñas

3 Se comparan tres anticoagulantes *Heparina* determina una respuesta rapida y se administra cada cuatro horas determinandose el *tiempo de coagulacion por un metodo sencillo* (metodo de Lee White) El *dicumarol* produce su efecto terapeutico de 36 a 48 horas después de administrado Las pruebas de laboratorio para determinar el tiempo de la protrombina deben hacerse diariamente durante el período de administracion de la droga Estas pruebas estan altamente especializadas y requieren los servicios de tecnicos de laboratorio Los pacientes que reciben la terapia por dicumarol estan continuamente en gran peligro ya que segun las palabras de Allen "un fin de semana

prolongado en el que están cerrados los laboratorios puede ser desastroso."

El preparado de Heparin-Pitkin representa un notable adelanto sobre la heparina y y el dicumarol ya que determina un efecto inmediato y se administra una vez cada 48 horas. El tiempo de coagulación se determina por un procedimiento sencillo (una modificación del método de Lee-White/Howell). Esta preparación puede emplearse como el único agente para obtener un efecto de anticoagulación continua y para obtener una respuesta anticoagulante inmediata en combinación con la terapia anticoagulante.

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A Changing World?

It was the best of times, it was the worst of times, it was the age of wisdom, it was the age of foolishness, it was the epoch of belief, it was the age of incredulity, it was the season of Light, it was the season of Darkness, it was the spring of hope, it was the winter of despair, we had everything before us, we had nothing before us, we were all going direct to Heaven, we were all going direct the other way—in short, the period was so far like the present period, that some of its noisiest authorities insisted on its being received, for good or for evil, in the superlative degree of comparison only.—Dickens. *A Tale of Two Cities.*

Contributions to the Therapy of the Varicose Complex

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IN THE treatment of the varicose complex sclerotherapy and proper bandaging are important therapeutic implements

The "Airblock Technic" in Sclerotherapy— Sclerotherapy has stood the test of time Properly used, especially postoperatively after vein ligation, it is an effective means of obliterating useless venous space Its theoretical basis is a postinjectional thrombus initiated by endothelial necrosis caused by the sclerosing agent [1]

Two methods are used the full vein technic, as recommended by Riddle, and the empty vein technic, as recommended by Mc Pheeters[3] and others

Although it is theoretically ideal the empty vein technic is not used widely owing to technical difficulties and the inherent danger of paravenous injection The full vein technic on the other hand, is a simple procedure but decreases the sclerosing property of the agent by diluting it with blood

To overcome both handicaps I recommended six years ago a method by which a small amount of air is introduced into the vein segment prior to injection of the sclerosing agent,[4] with the aim of expelling the blood completely from a small section of the treated vein, after which the sclerosing agent is injected into the airfilled pocket The sclerosing agent comes in direct contact with the intima for a short time at least, until it is diluted by the onrushing blood

There is no danger of air embolism when small amounts of air are injected into the superficial leg veins The air bubble is completely absorbed by the blood stream and never reaches the pulmonary circulation According to H F Richardson[5] and his co workers, 480 cc of air entering the venous system in twenty to thirty seconds will cause death in a person weighing 60 Kg In the entire national and international literature I was unable to find a single case in which fatality occurred when air entered the saphenous vein and its tributaries and I never saw any clinical sign of air embolism in a series of several hundred injections In this connection it is interesting to note that Markow and his associates[6] injected 100 per cent oxygen intravenously in amounts of 3,000 22,000 cc (10 cc per minute) in the treatment of severe asthma without occurrence of air embolism or vapor lock

TECHNIC

The technic is simple With the patient standing or sitting the air and subsequently the sclerosing agent are injected in one movement It is necessary to watch for the "balloon sign (subcutaneous emphysema) If this occurs the bevel of the needle is not entirely in the lumen of the vein, and one must choose a different injection site

The advantage of this technic is demonstrated in Figure 1, which is a statistical representation of the comparative results of the conventional and airblock methods The airblock method series shows an increase of 10 per cent in "takes"

There were four deep sloughs in the conventional series, and no deep sloughs in the airblock series

A very important advantage of this method is the avoidance of a paravenous injection

Ulcers from paravenous infiltrations are very annoying to the patient and embarrassing to the surgeon Last year I excised a slough ulcer which had persisted for over ten years

The Activity of Anionic Surface Active Compounds in Producing Vascular Obliteration—L Reiner in 1946 attributed the thrombogenic property of soap solutions to "the surface activity of the fatty acid anions formed

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Submitted for publication August 19 1949
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TABLE 1.—*The Thrombus in the Light of Effective Sclerotherapy*

Number	Subsequent fate of thrombus	Potential avenues of recanalization	Significance for effective sclerotherapy
1	Clot contraction	Formation of sinuses, later surfaced by endothelium	Defeats the purpose of sclerotherapy
2	Clot absorption by phagocytosis	Blood may tunnel its way through the deteriorating thrombus	Defeating the purpose of sclerotherapy
3	Central softening		Defeating the purpose of sclerotherapy
4	Organization: formation of vascular granulation tissue	Several of the newly formed capillaries may become collateral vessels	Defeating the purpose of sclerotherapy
5	Organization: transformation of granulation tissue into scar tissue	Permanent vein occlusion	*Useful*
6	Phlebolith formation		Undesirable

in aqueous solutions of soap." He studied the effectiveness of the synthetic anionic detergents in obliterating veins and found that sodiumtetradecylsulfate (S.T.S.) was more potent than the soap solutions, thereby producing less tissue reaction than sodium ricinoleate and sodium morrhuate. Cooper[8] and Hirschman[9] tested this agent in large series of cases and confirmed the conclusions based on pharmacologic observation.

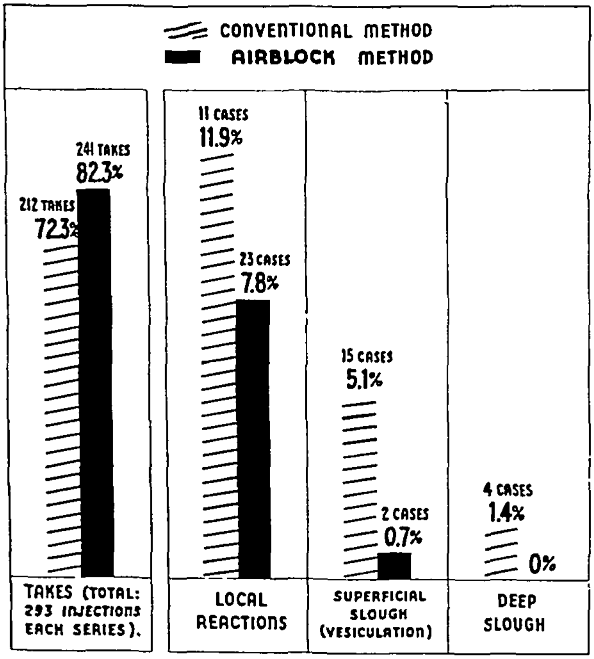

Fig. 1.—Comparative study of two series of 293 injections (each) of sclerosing agents into varicose veins.

Comparing the effectiveness of S.T.S. with that of fatty acid salt solutions, I was able to produce a slightly higher number of "takes" with S.T.S. solution, using only one-fourth of the dose used in the fatty acid series.[10]

To utilize the thrombogenic activity of the S.T.S. anions to the utmost, I injected S.T.S. foam into an intravenous airblock (Fig. 2).

By an alternate method, the froth may be produced by shaking the bottle, which contains a 3 per cent ST.S. solution. Then the foam is aspirated into the syringe. Before the injection is done, about 0.5 cc. of air is aspirated. After the vein is entered, first the air and then the foam is injected.

The wall of the S.T.S. foam bubble, with its high concentration of S.T.S. anions, acts directly upon the intima, producing endothelial desquamation (L. Reiner[11]). At this time I am not able to say how long the foam remains in the vein segment. When the preparation was injected into a test tube filled with blood, it took nine hours and forty minutes for the foam to disappear.

Although I believe that the small amount of foam injected into varicosities is innocuous and will not lead to embolism, the injections

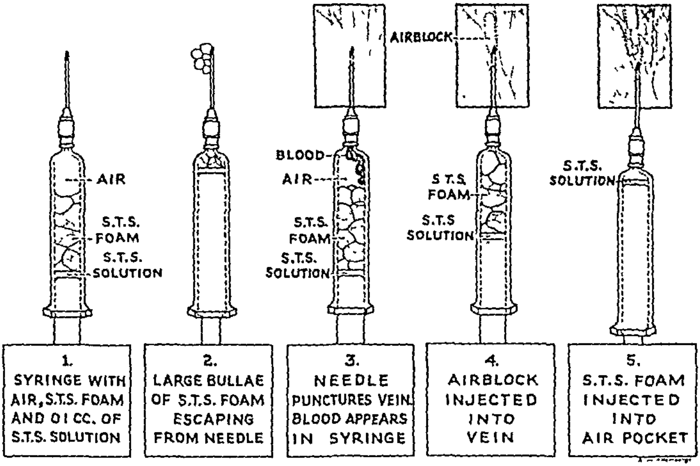
AIR
S.T.S. FOAM
S.T.S. SOLUTION
BLOOD
AIR
S.T.S. FOAM
S.T.S. SOLUTION
AIRBLOCK
S.T.S. FOAM
S.T.S SOLUTION
S.T.S. SOLUTION
1. SYRINGE WITH AIR, S.T.S. FOAM AND 0 1 CC. OF S.T.S. SOLUTION
2. LARGE BULLAE OF S.T.S. FOAM ESCAPING FROM NEEDLE
3. NEEDLE PUNCTURES VEIN BLOOD APPEARS IN SYRINGE
4. AIRBLOCK INJECTED INTO VEIN
5. S.T.S. FOAM INJECTED INTO AIR POCKET

Fig 2 —Thrombus production by minute doses (less than 0 05 cc) of sodium tetradecylsulfate (S T S)

were done on closed vein segments after high and low ligation.

In an investigational series of 130 cases in which I tried to establish the smallest thrombogenic dose of S.T S solution, the average amount of actual solution was 0 1 cc the highest amount 0 4 cc

When the syringe is shaken, about 20 per cent of the solution goes into foam (Petretti[11]) In this series the supernatant foam only was injected, the solution being left in the syringe

The number of "takes" in this series was 87, or 66 9 per cent, which is quite remarkable in view of the minute amount of solution used

The size of the treated varicosities ranged from Grade I to Grade IV The number of takes can be increased considerably by using all three layers: air, foam and solution, doing the injection in this sequence

By varying the amount of solution one can adjust the technic to the size of the veins. This technic proved to be decidedly effective in the treatment of difficult veins like those in the malleolar region and those of the dorsum pedis.

Massive obliteration should be avoided. A vein segment becomes obliterated secondarily between two obliterated sections, whether this is achieved by ligation or by sclerotherapy

The injection of soapy froth into veins is not new It has been recommended for the injection of superficial feeder veins by Foote[12] and others.

Figure 3 shows the histopathologic appearance of the thrombosed vein nineteen weeks after sclerotherapy with the use of S T.S foam (0 03 cc of actual solution). No endothelial cells are present. The lumen is obliterated by proliferating fibrous tissue arising in the subintimal area Throughout this zone old blood pigment is present. The muscularis and adventitia are diffusely infiltrated by a chronic inflammatory reaction consisting of round cells and plasma cells

THE ROLE OF THE THROMBUS IN SCLEROTHERAPY

The current conception of the role of the thrombus in sclerotherapy needs some revision:

If one studies the subsequent fate of a [illegible] ob[illegible]es tha[illegible]e primary blood

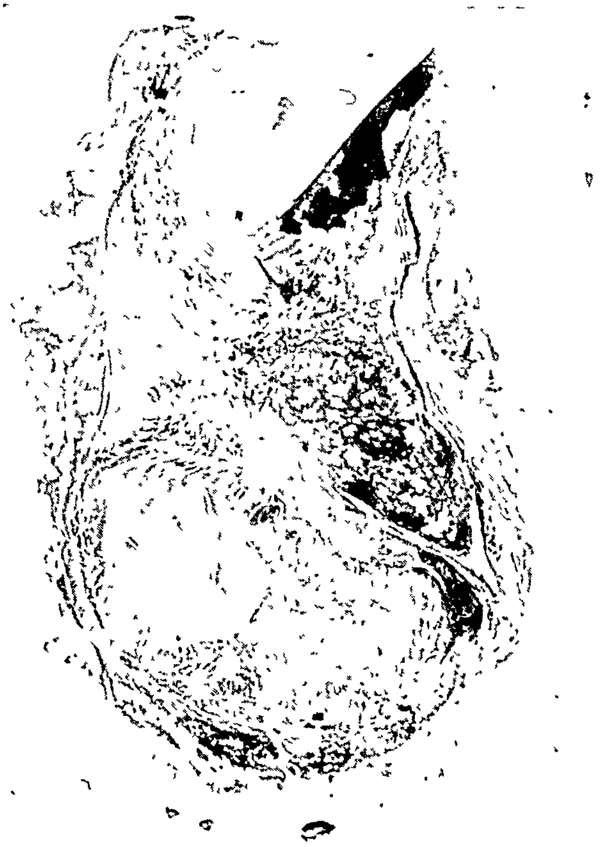

Fig. 3.—Obliterative thrombophlebitis produced by S.T S. foam (0.03 cc. actual solution).

clot retracts from the wall of the vein just as a coagulum will contract in a test tube, expressing the serum between it and the wall. In the vein these lateral sinuses later become lined by endothelium and are the beginning of new channels. Then the thrombus may either soften centrally, probably due to autolytic fibrinolysis (Zehnder[13]), or be resorbed by phagocytosis. The blood then may tunnel its way through the thrombus. Even the formation of vascular granulation tissue, the first stage of thrombus organization, may give rise to recanalization by dilatation and transformation of many of the capillaries into new veins. Only the cicatricial transformation of the primary granulation tissue gives a satisfactory permanent venous occlusion. Finally, a phlebolith, another late phase in the development of a thrombus, is undesirable in sclerotherapy.

Table 1 shows that only one of six possibilities in the development of the thrombus is suitable for effective sclerotherapy. Therefore, it seems that the thrombus should not be looked on as an ideal medium in sclerotherapy, but that it should serve only to glue the intima together, to produce venous obstruction by intimal concretion, in the same manner that thrombin is used as a surgical aid in the fixation of a split skin graft.

The conclusion should be drawn that it is wise to keep the thrombus as small as possible and to evacuate an excessive thrombus through a stab incision a few days after the injection.[14]

The Importance of Padding in Kinetic Bandages.—I should like to direct attention to the fact that the conventional technic of the skin-tight Unna's boot, as described in many textbooks, is not based upon rational physiologic principles. It is doubtful whether the zinc oxide of the zinc oxide–gelatin mixture has any therapeutic effect upon the skin after the bandage has become dry. On the contrary, the dry zinc oxide–gelatin mixture is apt to irritate the skin mechanically. This disadvantage is eliminated by the incorporation of a layer of sheet wadding into the bandage.[15] Jaeger[16] as well as Birger[17] has emphasized the inclusion of a padding layer in bandages for the leg.

Looking at the normal skin as nature's supportive boot, encasing the fascial, muscular and vascular structures, one finds that the epidermis and corium as supporting layers are not directly attached to the fascia or to the periosteum, but are separated from them by the compressible subcutis, which acts as a padding layer.

The "kinetic" character of supportive bandages as represented by Unna's cast, in contradistinction to the "static" character of the plaster of paris cast, requires the incorporation of a protecting compressible layer where padding is inadvisable, as it frequently is.

The "static" character of the skin-tight plaster of paris cast has as its purpose the immobilization of the whole extremity, including the joints, whereas the purpose of the "kinetic" zinc-gelatin bandage is *elastic compression* of the soft structures of the extremity, achieved by rhythmic contraction of the muscles under optimal freedom of joint motion.

TABLE 2 —*Bandaging in Peripheral Vascular Disease*

Type of bandage	Amount of pressure and padding used in bandaging	Effect and indication	Material
A. Protective	No pressure varying amount of padding	a Antiphlogistic effect of wet compresses in acute dermatitis and lymphangitis b Mechanical protection preservation of dermal turgor in *arterial disease*	a Wet compresses b Lassar's Paste Sheet wadding Cotton bandage
B Supportive	Moderate pressure and padding	Compression of subcutaneous varicosities *Gravitational syndrome* with and without obstruction of deep vein channel Perthes positive and negative	Lassar's paste Sheet wadding Unna's boot or elastic bandage with or without adhesive coating
C Compressive (pressure)	Maximal pressure Heavy padding	Compression of subcutaneous and subfascial veins *Gravitational syndrome* with patency of deep vein channel *Perthes positive*	

If an Unna's boot is used in cases of gravitational or postphlebitic syndrome in which the nutrition of the skin itself is damaged by the underlying pathologic process (mainly fibrosis of the arterioles) any further damage to the superficially lying vascular rete subpapillare should be avoided. It is to be remembered that the stratum corneum and the stratum lucidum are not pliable and would create pressure damage to the rete subpapillare if it were not for the pliable and padding layer of the stratum Malpighii

The "padding principle is followed throughout the structure of the human integument The padding layer for the rete subpapillare is the stratum Malpighii of the epidermis the padding layer for the rete cutaneum is the reticular layer of the dermis

From this point of view it is wrong to apply elastic adhesive tape directly to the skin and over the ulcer Strapping of varicose ulcer as advocated by many surgeons here and abroad, is a physiologically unsound procedure In many cases of nutritionally damaged skin the elastoplast tears off the superficial layer of the epidermis on removal This lays open the rete Malpighii which becomes progressively infected and necrotic until a full blown ulcer is established

The padded Unna's boot consists of the following layers

1 Unguentum or pasta zinci to cover the skin of the leg It helps to preserve the p h and the turgor of the skin
2 A single layer of dry wide mesh 3-inch (7 5 cm) gauze bandage
3 A single layer of sheet wadding
4 A 4 inch (10 cm) wide mesh gauze bandage saturated with the zinc oxide–gelatin mixture This layer must be painted (reinforced) with warm liquefied zinc–gelatin mixture
5 A 3 inch wide mesh gauze bandage The heel has to be entirely included into the bandage

Cooper[1] uses a "Tar Lassarpaste Talcum layer" as a therapeutic agent and a padding layer as well It is covered by an Unna's boot This type of bandage produced excellent results in several of my stubborn cases

Classification of Leg Bandages —According to the amount of pressure applied three types of bandages are differentiated

The *protective* bandage is applied without pressure

The *supportive* bandage exerts pressure upon the sub [illegible]

The *pressure* bandage exerts pressure upon the subcutaneous and subfascial vessels.

Table 2 is a synopsis of data on the three types of bandages.

The protective bandage is used in cases of arterial disease and in acute surgical and dermatologic emergencies; the supportive and *pressure bandages are used in the gravitational* syndrome, the latter only when there is a positive Perthes reaction.

SUMMARY

1. To the two existing methods of venous sclerotherapy, the empty vein and the full vein technic, a new third method is added: the so-called "airblock" technic. Here an air bubble precedes injection of the sclerosing agent. There is no danger of air embolism. With this method the number of "takes" is slightly increased; the amount of the sclerosing agent can be greatly reduced, and paravenous injections are entirely avoidable.
2. The thrombogenic surface activity of the anions of sodium tetradecylsulfate, a highly effective sclerosing agent, is demonstrated. Sodium tetradecylsulfate foam is highly thrombogenic, even in minute doses (as low as 0.03 cc. of actual solution).
3. A combined technic with air, foam and actual solution (in the syringe), injected in this sequence, appears to increase the number of "takes" considerably, thereby keeping the amount of actual solution low (less than 0.5 cc.) even in the treatment of veins of large caliber.
4. The importance of minimal thrombosis in sclerotherapy is stressed.
5. The significance of padding in kinetic leg bandages is discussed.
6. A classification of bandages used in peripheral vascular disease and the indications for their use are presented.

RÉSUMÉ

1. Aux deux méthodes actuelles de sclérothérapie veineuse (techniques de la veine à vide et de la veine remplie) une troisième *méthode vient s'ajouter. On l'appelle la technique* de "l'airblock" durant laquelle l'injection de l'agent produisant la sclérose est précédée par l'injection d'une bulle d'air. L'embolie gazeuse n'est pas à craindre. Cette méthode donne un peu plus de chances de succès que les autres: la quantité du liquide sclérosant peut être grandement diminuée et les injections paraveineuses peuvent être tout à fait évitées.
2. On démontre l'activité thrombogénique de surface des anions de sodium tetradecyl *sulfate, puissant agent sclérosant. L'écume de* sodium tetradécyl sulfate est fortement thrombogénique, même en doses aussi faibles que 0,03 cc de solution actuelle.
3. Une méthode combinant la bulle d'air, l'écume et la solution elle même (dans la seringue) injectée dans cet ordre parait augmenter grandement le nombre de réussites et réduit la quantité injectée de la solution elle même (doses de moins de 0,5 cc, même dans le traitement de veines de grand calibre).
4. L'auteur souligne l'importance d'un minimum de thrombose dans la sclérothérapie.
5. L'on discute l'importance du rembourrage compris dans le bandage kinétique de la jambe.
6. Une classification des bandages employés dans des cas de maladies vasculaires périphériques est présentée ainsi que sont données des indications quant à leur usage.

RIASSUNTO

1. Ai due metodi di scleroterapia venosa comunemente seguiti, cioe' quello a vena piena e vena vuota, l'A. aggiunge un terzo metodo: quello cosìdetto a blocco d'aria, in quanto una bollicina d'aria precede l'iniezione della sostanza sclerosante. Non esisterebbe alcun pericolo di embolismo gassoso. Con questo metodo si ridurrebbe la quantita' della sostanza sclerosante: si eviterebbe l'inconveniente delle iniezioni paravenose: si migliorerebbero i risultati della cura.
2. L'A. documenta l'attivita' trombogenica —in superficie—degli anioni di tetradecilsolfato di sodio. *La schiuma di tetradecilsolfato* di sodio e' fortemente trombogenica anche in dosi minime (fino a 0,03 cc. della soluzione).
3. I risultati sembrano migliorare notevolmente allorquando viene iniettata dapprima *l'aria, poi la schiuma ed infine la* soluzione sclerosante (nella stessa siringa). Con questa successione, la dose della soluzione puo' essere ridotta a 0,5 cc. anche nella cura di voluminose vene varicose.

4. E' molto importante ridurre al minimo la trombosi nella scleroterapia delle vene

5. Discute infine le indicazioni per l'uso di bendaggi (di cui viene avanzata una classificazione) nella cura delle malattie vascolari periferiche.

RESUMEN

1. Se ha agregado un tercer método a los dos métodos existentes de escleroterapia [illegible] que eran los de la vena vacía y de la [illegible] llena, siendo la nueva técnica la del [illegible] gaseoso en la que se hace preceder de [illegible] buja gaseosa la inyección del agente [illegible] sante. No existe peligro de embol[illegible] este método aumenta el número de [illegible] satisfactorios; puede reducirse gra[illegible] la cantidad del agente esclerosante [illegible] por completo las inyecciones para [illegible]

2. La actividad superficial [illegible] de los aniones del tetradecilsulfa[illegible] agente esclerosante muy efec[illegible] trada por el autor. La espuma [illegible] sulfato es altamente trombogé[illegible] dosis muy bajas (hasta de 0[illegible] ción actual.

3. La técnica [illegible] espuma y [illegible] actual [illegible] [illegible] el número de éxitos [illegible] por tanto mantener baja [illegible] [illegible] actual [illegible] en el tratamiento [illegible]

4. Se destaca la [illegible] mínima en la escleroterapia.

5. Se estudia el [illegible]

6. [illegible]

periféricos así como de las indicaciones para su uso

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13. [illegible]
14. [illegible]
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16. [illegible]

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Editor

Polyposis of the Colon

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KNOWLEDGE of polyposis of the colon is not new. Menzel in 1721 was perhaps the first to describe a case. His study stimulated Rokitansky to write on the subject in 1839. Lebert in 1861, Boas in 1901 (who was probably the first to differentiate polyposis from adenoma and papilloma) and Cripps in 1882 also wrote on the subject. The work of Cripps stimulated interest in familial polyposis.

Erdman in 1925, Wesson and Bargen in 1934 and Schemeden and Wisthaus in 1927 all proposed varying classifications of polyp formation. Rankin and Fitzgibbon in 1931, studying the available reports and supplementing these with their own clinical and pathologic studies, presented their conclusions to the effect that most benign adenomas of the colon become malignant. Rankin called attention more forcefully to the congenital incidence of polyps as ranging from 0.13 per cent in children to 21.4 per cent in all age groups, and expressed the opinion that 60 per cent of all benign lesions of the colon are polyps.

It was Cuthbert Dukes in 1930 who laid down perhaps the most definitive pattern for the pathogenesis of polyposis. It was Hauser in 1895 who presented convincing conclusions as to the association of polyposis with malignancy. His paper made a great impression upon surgeons throughout the world, because practically every paper written since Hauser's time has called attention to the association of malignancy with polyposis of the colon and rectum.

Polyps are seen in persons of all ages. They occur far more frequently in children than was formerly realized. They occur in the second, third and fourth decades of life, the incidence perhaps reaching its peak at about 30 years of age.

When bleeding is encountered in a child as the most prominent symptom, it is reasonable to assume that the cause is an adenomatous polyp in the rectum or colon. As regards children especially, the surgeon must keep his mind centered on the two clinical types; namely, the familial type of multiple polyposis and a polypoid disease in which only one or two polyps are discovered.

In the cases of children brought in for possible prolapse of the rectum, the offending factor often is a protrusion of the polyp together with an eversion of the lower portion of the rectum. If the polyp is situated 25 cm. or less above the anal outlet, definite cure can be accomplished from below by fulguration, but if the lesion is more than 25 cm. above the outlet laparotomy is necessary.

It is all-important from the standpoint of mortality to recognize these lesions as early as possible. The surgeon has a grave responsibility to the mother, who in case after case brings her child with the story that there are streaks of blood in the stool. Dr. J. Milton Stockman of Knoxville has called attention to the fact that, although blood-streaked mucus is a suggestive sign of polyposis and possible malignancy, blood streaking in the stool is a diagnostic sign.

When one recounts the vast number of cases in which polyps of the colon have been overlooked and discovered perhaps too late to yield themselves to adequate and complete treatment and cure, one really becomes convinced of the necessity for thoroughness of diagnosis. The statistics are variously quoted, but on an average one may assume that about 60 per cent of malignant and benign lesions of the colon occur in the rectum and within its distal 20 cm. By far the greater number of these are located within reach of the examining finger.

The best roentgenologists in the country will admit that they are not capable of diagnosing polyps in the colon or even malignant lesions less than 1 cm. in diameter. As a matter of fact, this figure more nearly approximates 2 to 5 cm. unless the roentgenologist is exceed-

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From the Department of Surgery, Acuff Clinic.
Submitted for publication May 27, 1950.

ingly diligent as well as capable in his examination

Therefore, a proctosigmoidoscopic examination must be a supplemental procedure in all thorough examinations of the colon In nearly all cases in which the patient's age is from 30 to 40 years, my co workers and I do a thorough study of the colon I am convinced that we miss many more pathologic processes than we discover

For lesions within 25 to 30 cm of the distal bowel, I place responsibility and reliability upon sigmoidoscopic examination From that point upward, of course, I rely upon the one or two procedures left, namely roentgen examination, especially the fluoroscopic aspect or surgical exploration By no stretch of the imagination should roentgen examination however thorough, be considered an adequate substitute for proctosigmoidoscopic examination

We are told that at least 33 3 per cent of lesions, either malignant or benign are situated too high in the colon for sigmoidoscopic examination to detect This, of course, leaves a considerable amount of large intestine inaccessible to actual visual diagnostic examination

In our Clinic it is the practice to have first a thorough preparation of the patient by purgation during the twenty four hours immediately preceding examination A careful history is taken by the gastroenterologist, and then a proctosigmoidoscopic examination is made which should give a clearance of at least 25 to 30 cm of the bowel If lesions are detected here it is leading evidence that there probably are other lesions scattered throughout the intestines, this however is not always the fact

The roentgenologist then takes over and the two work together in closest harmony and consultation If proctoscopic examination reveals lesions within reach of the fulguration needle or the biopsy circular electrode pathologic examination can be and should be made because it is common knowledge that 40 to 50 per cent of these lesions of the colon even

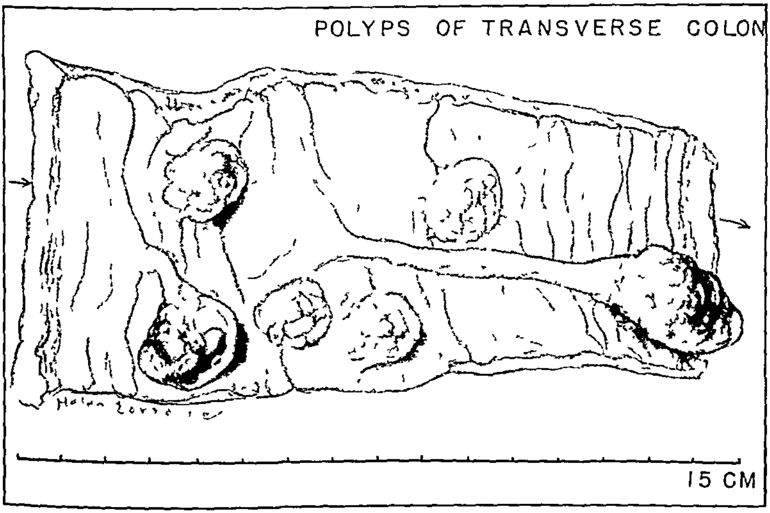

Fig 1—Numerous polypoid adenomas situated in the transverse colon, varying sizes and forms were noted The growths were removed by segmental resection

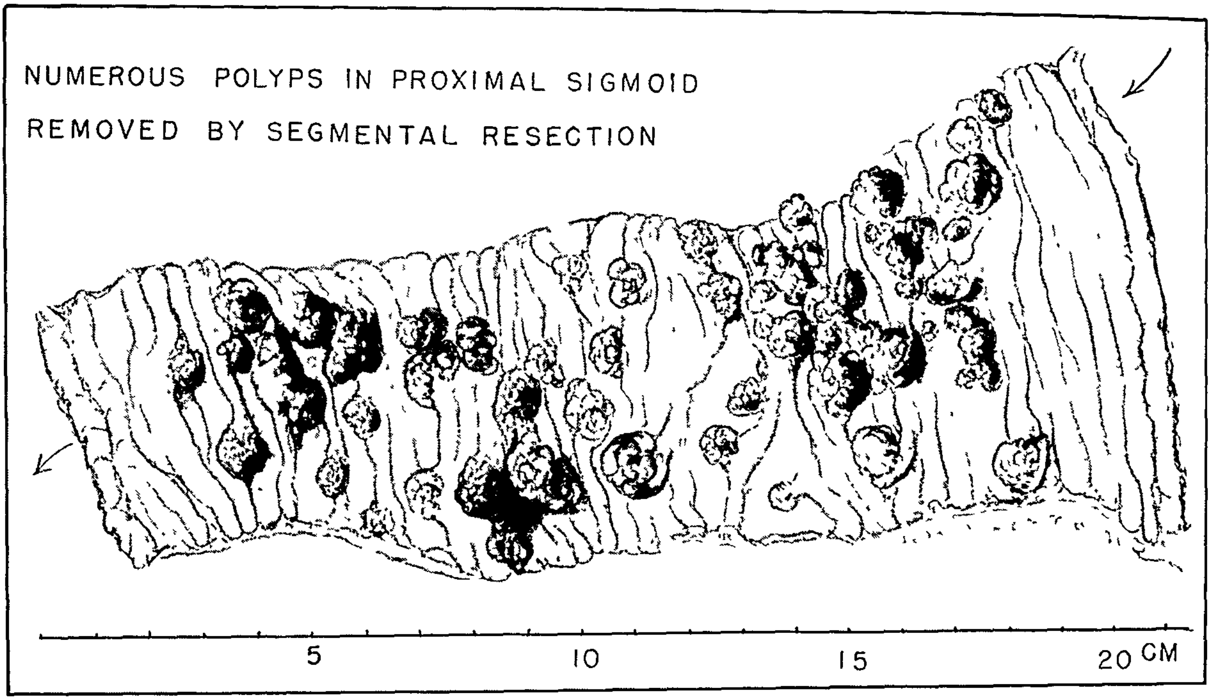
NUMEROUS POLYPS IN PROXIMAL SIGMOID
REMOVED BY SEGMENTAL RESECTION
5
10
15
20 CM

Fig. 2.—Extensive polyposis of the sigmoid extending into rectum. The splenic flexure of the colon was mobilized. Segmental resection of the sigmoid with anterior anastomosis between the descending colon and rectum was done.

though they are benign at first, ultimately become malignant.

We stress the significance of bleeding, either intermittent or continuous. We check for occult blood. We are particularly interested in cramplike pains in the abdomen, especially when they are referred to the left side. Here again, from the standpoint of diagnosis, lesions of the kidney and ureter must be eliminated. We have seen operations done upon the kidney—nephropexy, search for stones and even removal of stones from the renal pelvis —without relief of pain in the lower left iliac quadrant.

Many times attention is directed to the colon by secondary anemia, with no other symptoms present. This should be followed by examinations for occult blood in the stools. In children one is prone to think of intussusception as the first conclusive symptom; but, having removed a number of polyps with long pedicles, which are obstructive in children, we insist upon a careful examination of the colon when intestinal and abdominal symptoms present themselves.

It is significant too that persons of advancing years interpret constipation and the decreasing size of the stools, with no macroscopic evidence of blood, as only one of the transitional effects of age. I have learned to lay much stress upon flat stools or small stools, even though they come with regularity. It is well known to physicians and surgeons that many well advanced malignant lesions of the circular type in the colon are of the so-called silent or painless type.

Lesions of the colon, when seen early, lend themselves wonderfully well to curative therapy by extirpation or even fulguration. For this reason it becomes all the more incumbent upon the surgeon to find these lesions and find them early, and they can be found only with the closest cooperation among all concerned, particularly the gastroenterologist, the proctologist (where available), the roentgenologist and the surgeon. The responsibility rests upon these members of our profession, and the challenge to recognize early and correct the advancing mortality from cancer of the colon is obvious.

In order that more of these malignant lesions of the lower bowel may not be missed, I would strongly urge that every case of so-called hemorrhoids, particularly of the internal type, be thoroughly investigated prior to any operation for hemorrhoids This is our own practice in the clinic. We are cognizant that 3 out of 4 cancers or lesions of the lower bowel can be diagnosed with the aid of a sigmoidoscope. Such a routine examination prior to operation for what appear to be simple hemorrhoids will diagnose many lesions of the lower bowel Likewise all forms of chronic diarrhea, ulcerative colitis or diarrhea that has persisted for five to ten days certainly should be investigated by the sigmoidoscope and a bacteriologic study made

It is known that cancer of the rectum usually refers pain to the sacral area, or if the cancer is high in the sigmoid, the pain is more noticeable in the lumbar region Often pain in the back is the predominant symptom and if it is difficult to relieve by ordinary methods it may well signify a penetrating type of malignant lesion of the colon

It is within the scope of this paper to dwell for a moment upon the sigmoidoscope and preparation for an examination Two types of sigmoidoscopes are available, one of them has a distal and the other a proximal source of illumination It would certainly seem advantageous if these two types could be combined into one, utilizing the advantages of each but involving less of an armamentarium It is of decided advantage to have instruments of three or four different types as well as different sizes and lengths

I personally feel that preparation for a sigmoidoscopic examination is essential Many examiners do not seem to stress the preliminary cleansing enemas, especially if diarrhea has existed, feeling that irritation from the enema may well cause some inflammatory change in the color of the lesions My associates and I, however, like an enema consisting of 1 to 2 quarts (0 9 to 1 8£) of either plain water or physiologic solution of sodium chloride given the night before examination and repeated some two hours prior to the examination, the patient being asked to go to the stool frequently in order to insure complete emptying of the bowel. We do not suggest cathartics

If such an examination, after the preparation outlined, is done within six hours, the colon is still clean We suggest that the patient be placed in the knee-chest position, which is better handled if one has either a Haines or one of the proctologic tables (if the patient is not of advanced years or is not hypertensive or affected with a cardiac disease; for such patients the left lateral Simms position is always used) It is seldom necessary to give adults any type of anesthetic It is advisable, however to give children from 3 to 8 years of age some preliminary sedative The intestinal lumen should be moderately distended in order that the rugae may not conceal any small neoplasms that may be present This should be done with caution, since advanced neoplasms or pedunculated polyps may well cause an obstruction below, trap the air between the lesion and the instrument and thus rupture the bowel Suction is used continuously to keep the field clear, in order that the lesion may be grossly apparent Biopsy specimens should be taken of lesions of all types and should include the submucosal structures or a part of the base membrane in order to show the extent of the growth

Various forms of examination should be made in order to arrive at a definite diagnosis In a child the rectum offers a very easy way of examination, since the buttocks are shallow and do not offer the presenting difficulty We are also aware that three-fourths of these polyps are situated in the rectosigmoidal area or below and that they are usually true adenomas, rather firm and therefore easily felt The very fact that the child usually cries and is somewhat obstreperous in the examination brings on the necessary straining that will help to cause the polyp to descend to a point where the examiner's index finger can make contact with it If a sessile base is found at the attachment of the polyp, certain forms of electrosurgical adaptors may be used The child should be given the benefit of repeated enemas, contrasting with air if necessary, to determine if possible whether the polyps are situated above the 25 cm level.

Referring again to the question of gross blood in the stools. In determining the cause of this symptom, one encounters the possibility of diverticulitis of the colon. This, however, is much more easily differentiated by a competent roentgen study of the sigmoid, which will leave the barium clinging to well delineated areas in th [illegible] and sigmoid and will,

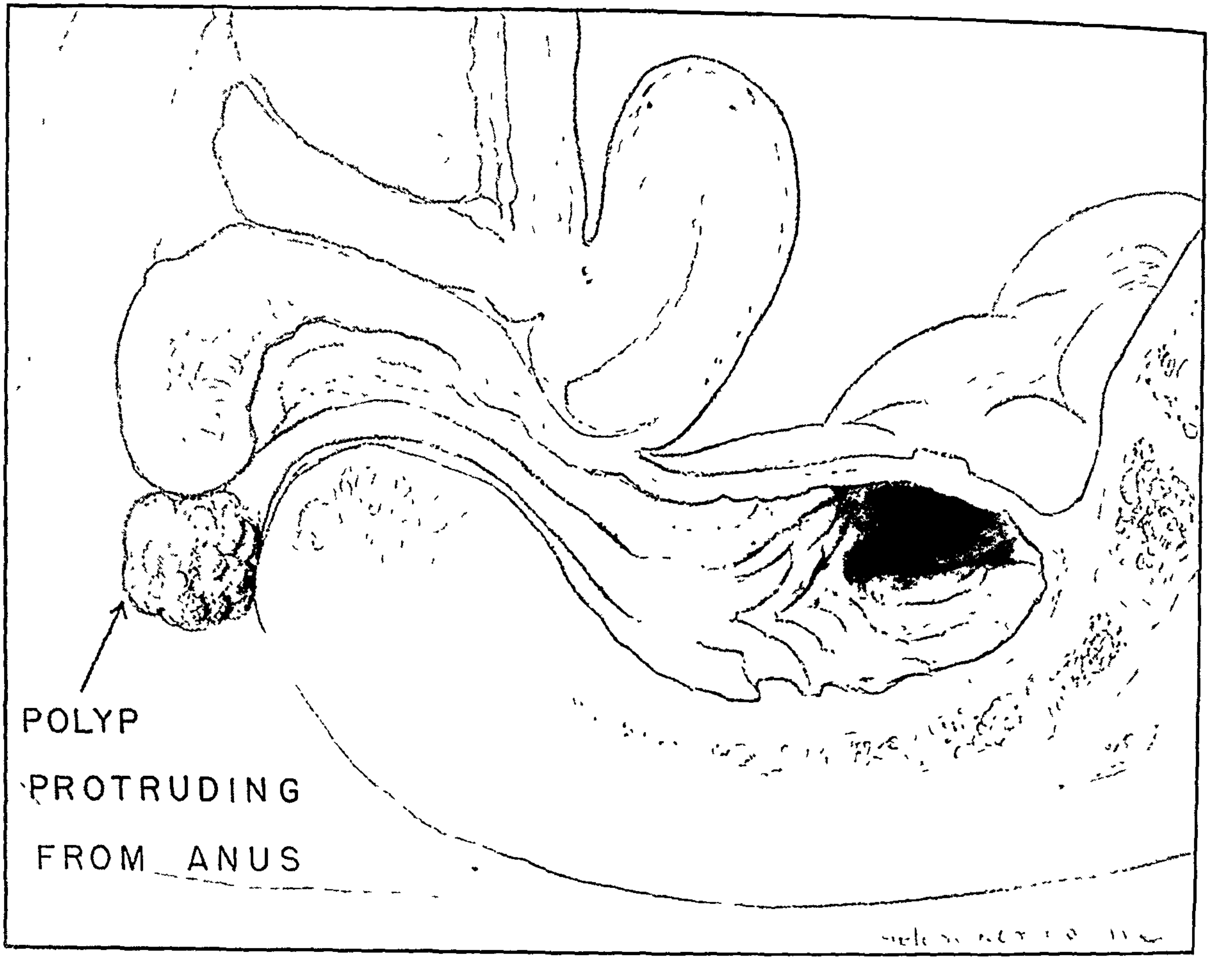

Fig. 3.—Polyp in the rectum with long pedicle, protruding from the anus.

n most instances, demonstrate the sacculaions. It may be said by and large that most of the polypoid lesions observed in the colon and rectum are in the premalignant stage. It becomes imperative, therefore, that these conditions be corrected before malignancy has developed.

Polyps are insidious and rather benign symptomatically as well as pathogenically until some such symptom as bleeding or cramping pain with strangury becomes evident. This fact is ample justification for clearance of the colon and rectosigmoid of every patient who comes for complete examination.

The fact that the colon and sigmoid can hide their pathologic conditions so effectively is all the more reason why one skilled in the use of the proctoscope and the sigmoidoscope should be assigned to make the examination.

There are two definite schools of thought when it comes to etiology. According to one school, polyps always arise upon a chronic inflammatory basis—inflammation caused by intestinal parasites, dysentery, ulcerative colitis, et cetera. According to the other school, they are definite new growths arising from the mucosa of the bowel. Pinckney and Sunderland have proposed a simple classification of these epithelial growths observed in the colon and rectum which places them in three groups: namely, (1) mucosal hyperplasias; (2) adenomas and (3) papillary adenomas.

The hyperplasias for the most part are compensatory and are seen adjacent to other types of lesions or infiltrating carcinomas. Adenomas are usually flattened, may be oblong, and show various sizes and shapes as they grow from the wall of the bowel. Papillary adenomas are the least frequent type and usually grow from the intestinal mucosa. The adenomas are usually pedunculated, and when malignancy develops it is usually noted at the outer border, while in the papillary variety changes occur in the center of the tumor.

Hyperplasia is usually a beginning of adenomatous formation and appears clinically benign. It may increase in size and growth, showing a wide range of microscopic patterns which are often noted as carcinoma when examined histologically. The papillomas are usually spongy, are located rather high, and are very hard to recognize by the palpating finger because of their soft spongy consistency as contrasted to the hard feeling of the adenomas These papillomas undergo rather early invasive malignancy and are much more treacherous from every standpoint than are the adenomas. This fact makes it all the more *imperative to do early biopsies of any type of* lesion found by the examiner below the 25 cm level of the rectosigmoid, because it offers easy accessibility.

Where may one expect to find polyps in the colon?

A search of the literature indicates rather conclusively that 55 to 70 per cent occur in the descending colon, sigmoid and rectum This area, it is recalled, is the most frequent site of carcinoma in the intestinal tract Twenty per cent are found in the hepatic, transverse and splenic flexures of the colon, while 25 per cent are located in the cecum and ascending colon.

It has long been generally accepted by the medical profession that at least 50 per cent of polyps of the colon will eventually become malignant.

Polyps may be sessile and confluent, in which form they are more prone to become malignant. The benign form is usually pedunculated and grows from the wall into the lumen of the bowel. Pedicles vary in length from 1 to 16 cm. They often become gangrenous because of bowel movements, change in *position, and in many instances* have thus been amputated with no after-effects save possibly a small or moderate amount of bleeding after evacuation.

Some years ago Dr. Robert A. Moore made a valuable contribution to surgical knowledge of the structure of polyps from his studies of 1,460 autopsies His data are here cited as to location and structure.

	Adenomas, %	Lipomas, %
Cecum	11.8	45
Ascending colon	15.1	10
Transverse colon	11.8	0
Descending colon	8.1	5
Sigmoid	27.9	5
Rectum	17.8	5
Flexures	9.2	0

Dr. Moore's summary showed 139 adenomas and only 13 lipomas in this rather extensive study

Polyps are found in 5 to 15 per cent of all persons over 40 years of age, in about 1 per cent of children and in an average for all ages of probably 20 per cent. Buie studied a series of patients examined proctoscopically and sigmoidoscopically and found one polyp in each group of 35 patients. Lawrence of Cook County Hospital, Chicago, reported his studies in 7 000 autopsies, in which he found an incidence *of 3.37 per cent of rectal polyps varying* from 0.5 to 4 cm. in diameter.

It is interesting to note how the *term* "polyp" remains in the literature despite the fact that Bacon and others have suggested the change to a more definite and qualifying term, *such as polypoid adenomatosis.*

Benign tumors of the colon may well be studied by dividing them into five structural groups, whose names may suggest the basic origin together with some of the more frequent characteristics.

1. Adenoma (polyps)
   Single, multiple, sessile, pedunculated
2. Papilloma
   Anal papilla
3. Angioma
4. Lipoma
5. Fibroma

Any of these tumors may be congenital or acquired. All are usually encapsulated, *grow* slowly, arise from the lumen on the mesenteric *border, show a familial tendency, do not metastasize,* show a decided tendency to ulceration and bleeding and may become obstructive. At least 50 per cent will probably become malignant.

In the diagnosis there are certain basic criteria upon which one can *depend. For example,* one must always keep in mind the [illegible], so [illegible] to our attention by Rankin, who reported the presence of polyps in four succeeding generations; by Jungling, who reported 13 cases in one family, and by Dukes, who reported the presence of polyps in 5 family groups.

The patient's history of abdominal cramps, pain, mucous discharge from the rectum, intermittent diarrhea, bleeding and secondary anemia is sufficient to direct one's attention to a rectal and sigmoidoscopic examination, by which it is known that 65 to 70 per cent of the lesions can be detected. Lesions higher up than the sigmoid must be diagnosed by roentgen and fluoroscopic examination.

The symptoms of polypoid adenomatosis conform to a fairly definite pattern, and the pathologic picture is consistent, as is revealed by our own case histories and those assembled by others. An analysis of symptoms in 100 cases of polyposis of the colon appeared in the following order:

Bleeding	62%
Intermittent diarrhea	42%
Abdominal cramps	24%
Pain	18%
Anemia	36%
Positive roentgen signs	15%
Positive sigmoidoscopic-proctoscopic signs	72%
Multiple and combined signs and symptoms	28%

REPORT OF CASE

A boy aged 1½ years was brought into the hospital with an intestinal obstruction evidenced by marked distention of the abdomen, transient peristaltic waves and extreme abdominal sensitiveness to touch, especially on the left lower quadrant.

There had been no bowel movement for thirty-six hours and no passage of flatus. There had been persistent vomiting of dark green material for eighteen hours. Numerous enemas had been given by the child's mother before he was brought to the hospital, but with no result.

Upon admission the child's rectal temperature was 103 F., the pulse rate 152, the pulse being weak and easily compressible; respirations were 36 per minute, very shallow and of the stertorous type. The facies was drawn and pinched, and the picture was one of extreme toxemia.

Laboratory examination of the blood revealed a value for hemoglobin of 10.2 Gm. per hundred cubic centimeters. The red blood cell count was 3,120,000 and the white blood cell count 24,750 per cubic millimeter. The total serum protein was 3.12 Gm. per hundred cubic centimeters. The albumen-globulin ratio was 2.24. Otherwise the results were essentially normal.

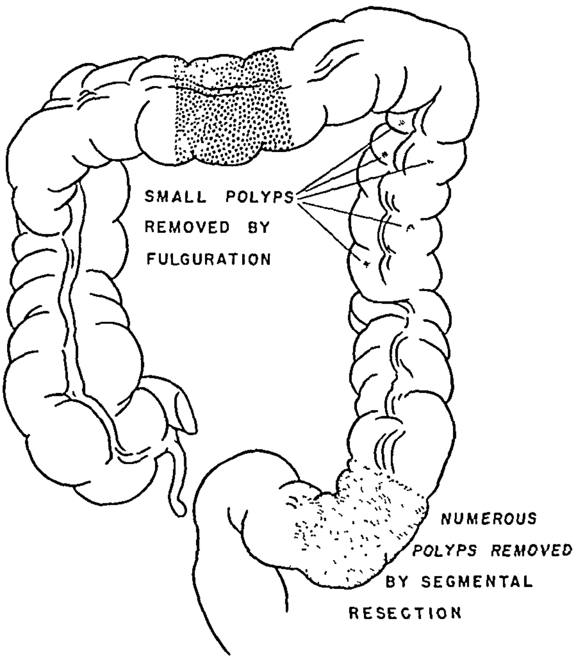

Fig. 4.—This drawing illustrates the presence of numerous polyps predominant in the transverse colon and sigmoid. Note the multiple small polyps in the upper part of the descending colon. Segmental resection was performed, with fulguration of the smaller polyps.

The roentgen flat plate showed marked dilatation of the loops of small intestine and marked distention of the colon. The lungs were clear. The diaphragm was high.

Whole blood (300 cc.) was given intravenously. Wangensteen suction was quickly instituted by means of a small Levine tube. After the transfusion, a 5 per cent solution of dextrose in saline solution was continued through the intravenous needle. Temporary improvement was soon noted, and a more thorough examination could then be made.

Digital examination per rectum revealed nothing; the ampulla was dilated, but no mass could be felt. Examination by sigmoidoscope was then done, and at 16 cm. a dark gangrenous mass was encountered, which was well impacted into the surrounding walls of the sigmoid and had caused complete obstruction. A long blunt dissector was passed around the mass, which seemed to identify a line of cleavage between the bowel wall and the tumor. Since we were reasonably sure that the mass was intraluminal, a medium-sized olive-tipped catheter was gently inserted along the line of cleavage made by the blunt dissector. After the catheter had been inserted for a distance of 4 additional centimeters, or a total of 20 cm, a large amount of gas escaped and the abdomen immediately became perceptibly softer The catheter was left in situ, and after six hours there was a marked improvement in the patient The edema in the walls of the sigmoid had decreased to a remarkable degree

By a series of gentle instrumental manipulations, the mass was dislodged and came farther down into view The anus and rectum were dilated to the widest possible extent, the growth was gently teased through the constricted area of the sigmoid caused by edema and exudate, a snare was passed over the mass, gentle traction was made, and the pedicle was snared off at the mucosal level The pedicle as well as the mass showed torsion and strangulation The base of the pedicle was identified on the posterior wall of the sigmoid and was cauterized with a Cameron fulgurating unit The gross specimen showed the pedicle to be 12 cm long by 1 cm in diameter The distal end of the tumor was round and measured 3½ inches (8 7 cm) in diameter

Supportive treatment by way of transfusions and intravenous medication was continued, and the child made a rather speedy recovery Frequent loose stools persisted for three days but subsided under small doses of sulfasuccidine and diet.

Pathological examination was difficult to obtain because of necrosis of the specimen, however, sections were obtained from the central part of the mass, which resulted in a diagnosis of polypoid adenoma A subsequent sigmoidoscopic examination eight weeks later showed no evidence of additional polyps, and the base of the one just described was completely healed, with no scar formation or constriction

The interesting points of observation in this case are

1 Solitary polyp 3½ inches (8 7 cm) in diameter

2 Elongated pedicle (12 cm in length)

3 Torsion of the tumor with strangulation and gangrene

4 Impaction into the walls of the sigmoid, causing complete obstruction of the colon

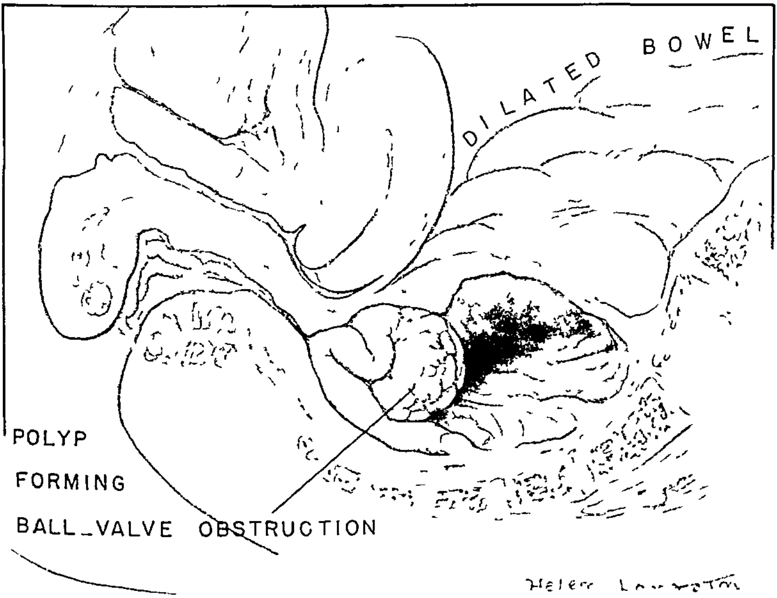

Fig 5 —Artist's drawing from the case presented in the text, in which complete obstruction resulted

5. The possibility of relieving the obstruction from below by passing a firm catheter along the side of the mass for purposes of decompression.

Three types of operative procedure are employed in our cases:

1. Fulguration of small to medium-sized polyps situated within the distal 25 cm. of the descending colon and rectosigmoid.
2. Definite localization of the polyp or polyps by air contrast enema and a competent roentgenologist, after which colotomy is performed, through which the growth is removed and the base excised; in some instances the base may be cauterized and the incision closed tight.
3. In extensive polyposis, segmental resection of the bowel with end to end anastomosis is done; subtotal colectomy with ileosigmoidostomy or anterior rectosigmoid anastomosis may be done, depending upon the location and extent of the lesions.

Preoperative preparation of the colon is done as before the more extensive abdominoperineal procedures.

End Results.—Seventy-four patients have been treated for polyposis of the colon. In 32 the polyps were successfully excised and fulgurated through the rectum; in 19 they were relieved by colotomy and base excision; in 8 they were relieved by subtotal colectomy; in 3 they were treated by single-barreled ileostomy

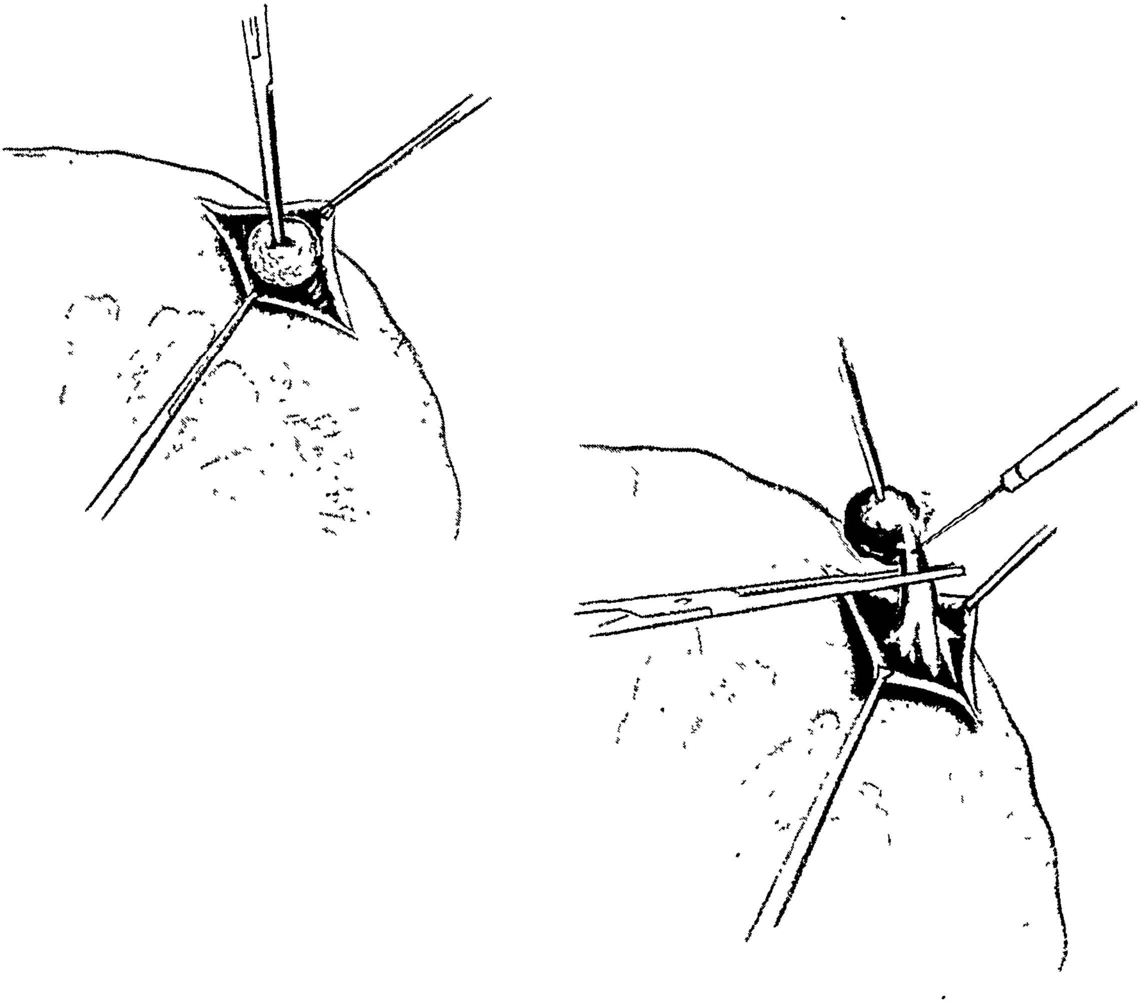

Fig. 6.—Details of operative procedure. Not clearly shown by artist, the base of the polyp is dissected and closed with intestinal suture. Excision is done with knife or cautery.

and secondary subtotal colectomy with ileosigmoidostomy Ten polyps in the sigmoid were malignant with metastases to the liver, subtotal colectomy was performed, with anterior rectosigmoid anastomosis There were 2 cases of extensive polyposis with ulcerative colitis Total colectomy was done, with the ileum attached to the lower part of the rectum and the anal sphincter preserved

Mortality and Morbidity—In the series of 74 cases the five year cures numbered 42 There were 12 deaths, 13 of the patients were improved, and polyps recurred in 7

SUMMARY

A short historical review of the early recognition of polypoid adenomas of the intestine is given

The high incidence of malignancy occurring in polyps is shown, the bizarre patterns of formation being illustrated by drawings The importance of more frequent and adequate examination of the colon is shown Thorough pre examination preparation of the patient is emphasized

The cooperation of gastroenterologist, proctologist, roentgenologist and surgeon is urged in the study of lesions of the colon

Treatment by three methods is described (1) removal of polyps by fulguration if lesions are relatively small and located within the distal 25 cm of bowel, (2) colotomy with base excision of growth and (3) subtotal colectomy with restoration of continuity by whatever method appears feasible after evaluation of the extent of the lesion and the amount of colon required to be removed

The end results in 74 cases are given

RESUMÉ

Bref aperçu historique du diagnosis du polype adenome de l'intestin aux premiers stages de la maladie

A l'aide de dessins, on montrera que les polypes sont tres souvent malins Les soins qu'on porte au malade avant l'examen sont une preuve de l'importance d'examens fréquents et adequats du colon

Il est urgent que le *gastro enterologue*, le *proctologue*, le *roentgenologue* et le chirurgien collaborent a l'etude des lésions du colon

Description du traitement d'apres trois methodes différentes

1 Enlevement du polypose par fulguration, si les lésions sont relativement petites et localisées a pas plus de 25 centimetres de l'intestin

2 *Colotomie* et enlevement de la croissance

3 *Colectomie* partielle avec réunion des parois selon les méthodes qui paraîtront les meilleures au chirurgien une fois qu'il aura determiné l'étendue de la lésion et la partie qui doit être enlevée

RESUMEN

Se presentan brevemente datos históricos sobre el diagnóstico precoz de los adenomas polipoides intestinales

Se muestra la alta incidencia de maglinidad que ocurre en estos Las peculiaridades en la formacion de estos son illustradas graficamente

La importancia que tiene un examen cuidadoso y repetido del colon, es puesta de relieve, asi como la meticulosa preparacion antecedente a este

Se urge la cooperación de un gastro enterologista, proctologista, Roentgenólogo en el estudio de estas lesiones del colon

El tratamiento se describe según los tres metodos que siguen

1 Extirpacion del polipo por fulguración si la lesión es relativamente pequeña y localizada dentro de los 25 cm de la parte distal del colon

2 Colostomia con extirpación de la base

3 Colectomia sub total con restoración de continuidad por cualquier metodo que aparesca feasible despues de evaluar la extensión de la lesión y la longitud de colon que debera extirparse

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A New Surgical Treatment for Keratoconus

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WITH REGARD to the etiology of keratoconus, surgeons still accept a confusing mass of theories from the past; namely, the possibility of local trauma at the lower paracentral area of the cornea; the congenital weakness of the cornea due to defective embryologic development; the calcium deficiency theory of Arnold Knapp, based on the observation of lowered blood calcium in a series of patients; the theory of endocrine imbalance due to disturbances of the thyroid or thymus gland; and finally, Jackson's hypothesis of impaired corneal nutrition due to systemic disease. The therapeutic measures employed, both conservative and surgical, have been based on these theories.

The surgical approach has been based on the view that the keratomalacic eye, or the eye with corneal ectasia, is unable to withstand even normal intraocular pressure. Therefore, by reduction of the intraocular pressure, definite elimination of an active factor can be achieved.

It is generally admitted that surgical treatment has given the best results. The surgical methods used in the past consisted of the following: alteration of the position of the pupil by Tyrell, 1814) in an attempt to avoid the anterior cone; the needling of the lens (Adam, 1817) to bring about a change in the refractive correction; repeated corneal puncture (Dix, 1847); the method of Bowman, in which a stenopeic slit was formed by excision of a small portion of the cornea at the periphery; excision (Baden, 1872) of the apex of the cornea; the Wiener operation (1925), consisting of the removal of an elliptical segment of the upper and outer quadrant of the cornea; and finally the trephining procedure described by Elliot and proposed in 1934 by Martin Green for the treatment of this condition.

Probably the most frequently used procedure is that of Green, who suggested a detailed study over a period of several months and the fitting of corrective lenses prior to the trephine. After the trephine, medical therapeutic measures, consisting of supplementary administration of vitamin A, vitamin D and riboflavin were instituted.

Several years of experience with trephining for keratoconus have shown it to be unsatisfactory. The postoperative intraocular pressure drops to 10 or 12 mm. of mercury, but after a month it reaches the previous normal level of 25 to 27 mm.

In 1944 one of us presented, in collaboration with Wolfe and Wolfe[1] a new surgical procedure for the treatment of glaucoma. It consisted, essentially, of a sclerectomy with external and suprachoroidal drainage. This procedure has been used in 14 cases of progressive keratoconus. The results so far have been most encouraging.

Technic: A broad conjunctival flap is dissected downward to the limbus under Tenon's capsule. Two silk sutures are then placed one on each side, carried through the conjunctiva and anchored in the sclera very close to the limbus. These are then laid to one side. A keratome incision is made at the limbus and enlarged with Wilder scissors along the limbus from the 10:30 to the 1:30 o'clock position (or, if the lens is to be extracted, from the 9:00 to the 3:00 o'clock position). A silk suture is then passed from beneath the conjunctival flap, through the flap, and exactly at the corneo-conjunctival function, such a loop being made on each side and then laid aside. A cyclodialysis is then performed, the angled Green iris repositor being swept through the 10:30 to 1:30 o'clock arc. This maneuver is followed by use of the straight graduated tip of the repositor to complete the cyclodialysis (see illustration).

In performing the cyclodialysis it is well to keep the histologic structure of the ciliary body well in mind. In the choroid structure the deli-

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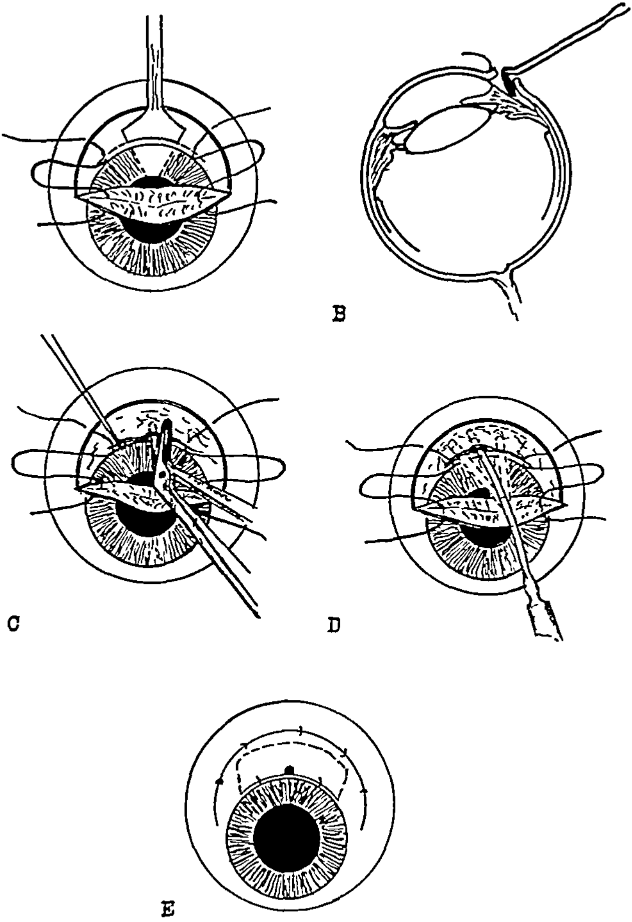

Modified Lagrange sclerotomy with cyclodialysis *A*, a broad conjunctival flap is dissected well down to the limbus, under Tenon's capsule and the episclera if possible Two scleral sutures are inserted in the sclera near the limbus at the 1 o clock and 11 o clock positions A keratome incision is made at the limbus and completed with scissors from 10 30 to 1 30 o clock (for cataract the scissors section is to 3 and 9 o clock) *B* the curved end of the Green iris repositor is inserted under the scleral margin of the section and the ciliary body is separated from its insertion at the scleral spur (For glaucoma the corneal section extends only from about 10 30 to 1 30 o clock, and is not so large as illustrated in *A, B, D* and *E*) *C,* the straight end of the marked Green

(Continued on [illegible] page)

(Legend for illustration on preceding page, continued)

iris repositor is inserted and the ciliary body dissected free of the sclera to a point just beyond the ora serrata, thus assuring contact with the perichoroidal space. The repositor has a graduated scale every 2 mm.) to gauge depth. Iridotomy or iridectomy is performed as indicated. *D*, either prior to or during this stage a silk scleral suture is passed through the corneal flap at the exact junction of the cornea and the conjunctiva, looped and laid aside. Holding the scleral lip with a hook, one performs a modified Lagrange sclerectomy with a Holth punch. If a cataract is removed, sclerectomy is the last step before closing the flap. *E*, schematic drawing. The two scleral limbal sutures are drawn up and tied. When a broad conjunctival flap is used, a double-needled suture is brought out through the conjunctiva at the limbus instead (*C* and *D*) and an additional conjunctival suture or a continuous water-tight suture is used. Black dot indicates the site of sclerectomy giving external drainage; dotted line indicates the area of cyclodialysis.

cate lamellae of the epichoroid are so formed that a potential space, the perichoroidal space, exists; however, anteriorly the lamellae disappear into the ciliary muscle, so that there is no such space in the region of the ciliary body. The width of the ciliary body is 4.6 to 5.2 mm. nasally and 5.6 to 6.3 mm. temporally, but one should allow the dissection to extend about 8 mm. from the limbus to be certain of extending beyond the ora serrata, as it is not enough merely to detach the ciliary body from the scleral spur. It has been shown anatomically that the iris arises not from the scleral spur or the limbus, but from the anterior end of the ciliary body; therefore, a true cyclodialysis does not touch the iris. To be certain of making contact with the perichoroidal space, therefore, it is essential that the dissection be carried backward behind the ora serrata. Then, and only then, has one any certainty of having performed a true cyclodialysis.

If the lens is to be removed it is done after the cyclodialysis, and is done intracapsularly. The scleral lip of the wound is now picked up and a sclerectomy performed with the Holth punch, accomplishing a modified Lagrange sclerectomy.

Any scleral tags present are cut smooth, and any bulging iris is merely snipped. The two looped sutures are drawn snug and tied, and four or five conjunctival sutures are used for closure. If desired, an over-and-under watertight running suture may be used for this last step with satisfactory results.

On completion of the operation a planocontact lens is applied and a complete tarsorrhaphy performed. The first dressing is done after five days; at this time the sutures in the

Data on 14 Patients Treated by Author's Method

Patient	Age	Eye	Vision corrected before operation	Intraocular tension before operation	Vision corrected 15 days after operation	Intraocular tension 15 days after operation	Vision corrected 1 year after operation	Intraocular tension 1 year after operation
1	18	L	20/40	26	20/40	15	20/25	16
2	22	L	20/50	27	20/40	12	20/30	14
3	16	R	20/30	25	20/30	14	20/30	14
4	25	L	20/100	27	20/40	16	20/30	16
5	22	R	20/80	28	20/60	18	20/25	16
6	19	R	20/200	24	20/80	16	20/30	15
7	18	R	20/50	25	20/25	12	20/25	16
8	27	L	20/80	27	20/30	17	20/25	16
9	30	R	20/40	28	20/30	16	20/25	16
10	17	R	20/100	24	20/60	18	20/30	16
11	19	L	20/200	23	20/100	13	20/40	20
12	23	L	20/80	24	20/80	18	20/40	20
13	20	L	20/40	30	20/40	16	20/30	18
14	19	R	20/40	26	20/40	15	20/25	16

lids and the contact lens are removed Administration of riboflavin, 10 mg daily is prescribed for sixty to ninety days Glasses to correct the refractive error may be fitted at the proper time

Results Postoperative hyperemia is moderate, and dressings on the second day have demonstrated external filtration under the flap and partial restoration of the anterior chamber, with lowering of the intraocular tension

The accompanying table gives a résumé of both preoperative and postoperative data on the reduction of intraocular pressure and the visual acuity observed before and after surgical intervention

SUMMARY

The treatment of choice for keratoconus of the progressive type is surgical A surgical procedure that permanently reduces intraocular tension is most likely to succeed

A technic for sclerectomy with external and suprachoroidal drainage is described, which accomplishes the desired result, a permanently low intraocular pressure

These observations are based on a small group of cases, too small to justify definite conclusions and it is intended to pursue the study over a longer period and with a larger series of patients However it is felt that a step forward has been made and that the sustained reduction of tension for at least a year is worthy of consideration

RÉSUMÉ

Le traitement par excellence pour le keratocone progressif est la chirurgie L'intervention operatoire qui réduit de façon permanente la tension intraoculaire est celle qui aura le plus de chances de succes

La technique pour la sclerectomie avec drainage externe et suprachoroidien y est décrite, technique qui atteint le résultat désiré une tension intra oculaire réduite de façon permanente

Les observations faites par l'auteur sont basées sur un petit groupe de cas trop peu nombreux encore pour justifier des conclusions définitives et l'on a l'intention de continuer cette étude a l'avenir sur un nombre plus important de malades Il parait cependant que l'auteur a fait un pas en avant et qu'une tension réduite continuée pendant au moins une annee mérite que l'on s'y intéresse

RIASSUNTO

La cura per il cheratocono progressivo e' preferibilmente chirurgica La maggiore probabilita' di successo e legata alle operazioni che riducono permanentemente la tensione oculare L'A descrive una nuova tecnica di sclerectomia, con drenaggio esterno e sopracoroidale, che mantiene una bassa pressione intraoculare I casi cosi operati sono ancora troppo scarsi per autorizzare conclusioni definitive L'A si ripromette una casistica piu' estesa nel prossimo avvenire Ritiene ad ogni modo che un progresso sia stato realizzato e che la diminuzione della pressione intraoculare per un anno sia degna di considerazione

RESUMEN

El tratamiento preferido del queratocono de tipo progresivo es quirúrgico Un procedimiento quirúrgico que reduzca permanentemente la tensión intraocular tiene más probabilidades de éxito

Se describe una técnica para la esclerectomía con drenaje externo y supracoroidal que produce el resultado deseado que es una presión intraocular permanentemente baja

Las observaciones del autor están basadas en un pequeño grupo de casos, muy pequeño para justificar conclusiones definitivas, por lo que desea continuar el estudio durante un periodo de tiempo mas prolongado y con una serie mayor de pacientes

Sin embargo, se cree que se ha dado un paso adelante y que es digna de consideración la reducción sostenida de la tensión conseguida durante un año por lo menos

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Case Reports

Congenital Atresia of the Duodenum

Report of Two Cases

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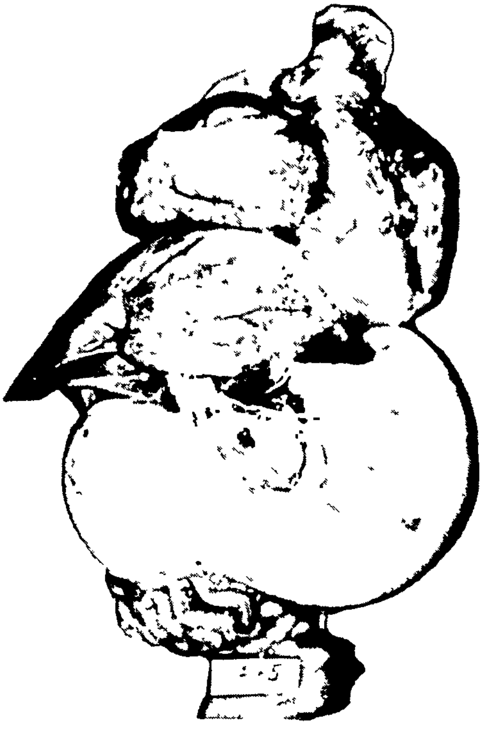
WITHIN recent years the surgical treatment of congenital lesions of the gastrointestinal tract has offered lifesaving approaches to conditions formerly considered hopeless. In many instances, however, the anomaly is discovered only at autopsy, because the possibility of its existence was not given serious consideration. Since characteristic symptoms are usually present, although misinterpreted, it seems justifiable to report 2 additional cases of an anomaly that can be diagnosed during life and corrected by operation. The infants in these 2 cases presented strikingly similar clinical signs and symptoms, and each proved to have congenital atresia of the duodenum. The lesion is uncommon, although a few cases have been reported.[1]

REPORT OF CASES

CASE 1.—C. H., an infant girl, was born of a mother 25 years of age who had had two previous normal pregnancies. The current pregnancy had been uneventful, and delivery was spontaneous and uncomplicated. The infant seemed normal. The birth weight was 6 pounds and 10 ounces (3,004 Gm.). Shortly after birth the child began to vomit but apparently responded to atropine therapy. Some regurgitation continued. She was discharged from the hospital on the sixth day. Two days later the mother brought her back, saying that the vomiting had continued at irregular intervals, usually taking place one hour after feeding. The vomitus resembled the material in the baby's formula. There was a steady loss of weight to 5 pounds and 2 ounces (2,325 Gm.).

Examination revealed the child to be dehydrated and marantic, with a sunken anterior fontanel. There were gray ulcerating plaques on the buccal mucosa. The epigastrium was distended. Visible peristalsis extended from the hypochondrium on the left to the right lower quadrant of the abdomen. The stools contained meconium. The temperature was normal on admission but rose terminally to 103 F. (39.4 C). Death occurred on the tenth day.

CASE 2.—In the second case the mother was 43 years of age, with a history of two pregnancies and one delivery. One child, 4 years old, had been delivered by cesarean section. The current pregnancy was uneventful until the seventh month, when hy-



Appearance of abdominal and thoracic organs. The dilated portions simulate an hourglass stomach. The dilated upper segment is stomach; the bulbous lower segment is the first part of the duodenum. The constriction is the pylorus, actually greatly dilated. The small intestines are completely collapsed.

From the Doctors Hospital and the Laboratory of Pathology, City Hospital, New York.
Submitted for publication Dec. 14, 1949

drammos developed and steadily increased On the day when confinement was expected a cesarean section was performed There was a large amount of amniotic fluid and during delivery the infant, a girl, aspirated a considerable amount Some difficulty was therefore encountered in inducing spontaneous breathing, but within half an hour the child's skin was pink and her general condition apparently satisfactory The birth weight was 3 pounds 8 ounces (1,587 Gm)

The child was placed in a Davidson crib and continuous oxygen was administered At frequent intervals a great deal of mucus was suctioned off

The first feeding was given eighteen hours after birth About ½ ounce (14 Gm) was taken At the second feeding, three hours later, the formula was given with difficulty the child became cyanotic and regurgitated most of it although she seemed hungry For the rest of the course, until her death on the tenth day, the notes read monotonously Two feedings at three hour intervals are taken hungrily and about one to two hours later are vomited

After the second day the vomitus contained blood stained or dark brown mucus There was a steady loss in weight to 3 pounds (1,361 Gm) Terminally there was severe dehydration in spite of repeated clyses

The observations at necropsy were exactly similar to those in Case 1 In both instances, when the viscera were exposed, the upper part of the gastrointestinal tract was seen to be greatly distended, its appearance simulating an hourglass The bulbous lower dilatation, however, proved to be a greatly distended first portion of the duodenum completely separated from the second portion The small intestine was collapsed and free of gas, presenting a *striking contrast to the dilated segments of the* tract The common duct emptied into the upper part of the second portion of the duodenum and lay along the inferoposterior wall of the dilated part Histologic examination revealed that the wall of the dilated duodenum was composed of all layers

COMMENT

A review of these cases indicates that the symptoms could have led to the diagnosis of congenital anomaly if certain features had been given their due weight In Case 1, the apparent response to atropine therapy was misleading It was of interest to learn that a surgical consultant, although inclined to the diagnosis of spasm, noted that the time of onset of symptoms was earlier than is usual in cases of pylorospasm When the child was observed on her second admission to the hospital the visible peristalsis, confined as it was to the epigastrium and the right side of the abdomen, was definite evidence of an obstructive anatomic lesion

In Case 2 the development of hydramnios during pregnancy might also have suggested a developmental anomaly Many reports in the literature mention this combination After birth, the repetitive phenomenon of a hungry infant retaining two feedings and regurgitating them almost at stated intervals later is practically pathognomonic of an obstructive lesion Roentgen studies in both instances would probably have confirmed the diagnosis and led to the surgical intervention that was indicated

SUMMARY

Two cases of congenital atresia of the duodenum resulting in death are reported and discussed The authors express the opinion that if the condition had been diagnosed promptly and suitable surgical measures had been taken the fatal outcome might have been prevented Signs and symptoms pointing to a diagnosis of congenital obstructive anomaly are suggested, including the antepartum development of hydramnios

RÉSUMÉ

Deux cas fatals d'atrésie congénitale du duodenum sont présentés et discutés Les auteurs pensent que si cette affection avait été diagnostiquée à temps et les mesures chirurgicales qui convenaient prises immédiatement, les deux malades auraient été sauvés Les signes et symptômes indiquant un diagnostic d'anomalie obstructive congénitale sont présentés, comprenant le développement d'hydroamnios avant l'accouchement

RIASSUNTO

Riportano e discutono due casi letali da atresia congenita del duodeno Ritengono che se la diagnosi fosse stata posta prima ed un 'operazione eseguita tempestivamente, l'esito sarebbe stato diverso Ricordano i sintomi ed i segni che consentono una diagnosi di ostruzione congenita, includendo un polidramnios nella vita endouterina

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Reticuloendothelial Hyperplasia of Bone

Report of a Case of Letterer-Siwe's Disease

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INCREASING interest has been manifested during the past decade in the problem presented by various types of reticuloendothelial hyperplasia of bone. This interest has resulted in a more careful study as well as a more satisfactory classification of the various types.

Variability in degree, including prognosis, could be the basis for such a classification, which should begin with the benign and usually solitary eosinophilic granuloma. Here the prognosis is good; the symptoms are referable to the lesion itself, involving little systemic reaction. Second in order, progressively, is Schüller-Christian's disease, a more chronic form, usually serious though not necessarily fatal. This type presents miscellaneous clinical manifestations, depending on the sites of multiple involvement and not necessarily associated with defects of the calavarium, diabetes insipidus or exophthalmus. As a rule the third and more acute form, known as Letterer-Siwe's disease, reaches a fatal termination within a few weeks or months, although it has been observed to pass into a chronic stage similar to Schüller-Christian's Disease.

The cause and interrelations of these three clinically dissimilar diseases are still undetermined, although various theories have been suggested.[1] No pathologic or roentgenologic signs or other decisive features absolutely pathognomonic of any of these three forms of reticuloendotheliosis are known at present;[2] consequently there seem to be no determining factors by which to identify a given condition, aside from the clinical manifestations and the course of the disease. According to Farber and Green[3] the three types of disease just mentioned are variations of the same basic process. They report also that they have found no evidence to indicate a disturbance of lipoid metabolism in connection with the disease.

The case presented here is of interest because of the unusual character of the lesion and because of the rarity of the disease process it is thought to represent.

REPORT OF CASE

S.C.S., a white girl aged 3 months, was referred to us by Dr. Philip Magrish. She was admitted to the hospital on Oct. 6, 1948, with the following history: About two weeks prior to the aforementioned date her parents became aware of a rounded tumor-like mass in the child's right scapular region. The growth progressed rapidly, accompanied with bodily weakness and limited function of the right arm. Both the birth and the neonatal period had been normal, and the child had been well prior to the onset of this illness. There was no history of trauma.

Physical examination revealed the child to be pale but apparently normal. The rounded mass overlay and contiguous with the right scapula. The right arm was internally rotated, and its voluntary motion was restricted. Examination otherwise gave negative results. Laboratory an erythrocyte count of 3,130,000 per cubic millimeter of blood, with 58 per cent hemoglobin (9 Gm.); the leukocytes numbered 9,300 per cubic millimeter, with 61 per cent polymorphonuclears, 11 per cent stab cells, 37 per cent lymphocytes and 2 per cent eosinophils. Smears showed markedly achromic red blood cells with microcytosis, poikilocytosis and polychromatic cells. Roentgenograms of the right shoulder girdle disclosed an osteolytic lesion of the body of the scapula, with erosion and expansion of the cortex. Since there was nothing characteristic in the clinical or roentgen data, the tentative diagnosis at this time was malignant tumor of the scapula, type undetermined. On the day following the examination a biopsy specimen of the scapula mass was taken with the patient under general anesthesia (open drop ether method). A 4-cm. soft,

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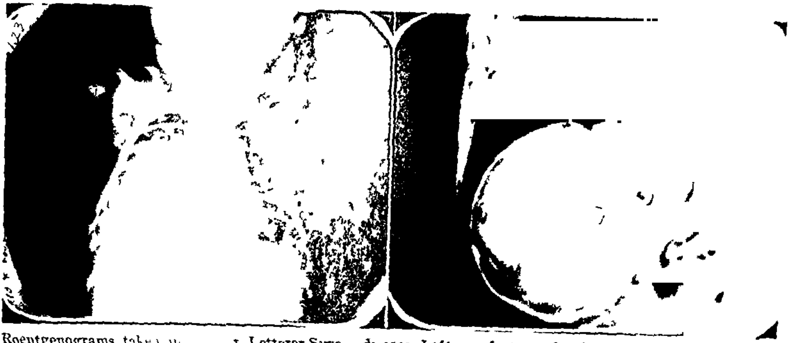

Roentgenograms taken in [illegible] Letterer-Siwe's disease. *Left, rarefaction of right scapula due to metastasis. Right, metastasis to skull.*

friable, reddish [illegible] was removed. The cavity was [illegible] and packed with petrolatum [illegible] of pathologic studies of the [illegible] follows. The gross specimen [illegible] 5 to 1 cm. in diameter, cons[illegible] yellow hemorrh[illegible] were attached [illegible] typical granu[illegible] large phagocyt[illegible] and nucleoli [illegible] of various siz[illegible] Large sheets [illegible] neutrophils a[illegible] out the secti[illegible] destruction. [illegible] pathologic [illegible] acteristic of [illegible]

The child [illegible] body weight [illegible] day was [illegible] the scapular [illegible]

On No[illegible] an interval [illegible] Regression [illegible] some impr[illegible] The patient [illegible] prior to [illegible] and [illegible] become [illegible] ceding [illegible] the pa[illegible] vealed [illegible] [illegible] the tumor [illegible]

and the temperature reading was 100.4 F. Laboratory studies were charted as follows: Red blood cells per cubic millimeter, 1,960,000, with 20 per cent hemoglobin; white blood cells, 7,400 with [illegible] per cent polymorphonuclears, 12 per cent [illegible] and [illegible] per cent lymphocytes. [illegible]

COMMENT

In review, we note that at the time of the first admission clinical and pathologic observations seemed to substantiate the diagnosis of eosinophilic granuloma of the scapula. It was felt then that the lesion would probably resolve after the curettage carried out at the time of biopsy; accordingly, roentgen therapy was advised as a possible adjunct to healing. The subsequent course of the disease, however, entailing a development of visceral lesions, fever and marked anemia, has led us to consider this case an example of Letterer-Siwe's disease. Whether the cranial defect was present at the time the scapular biopsy was performed is not known, as no roentgen studies of the skull were carried out at that time.

SUMMARY

A case of Siwe-Letterer's disease in an infant girl is reported. A 4-cm. tumor mass was removed from the right scapular region after a tentative diagnosis had been made of malignant tumor of the scapula, type undetermined. Histopathologic study of the tumor revealed the characteristics of eosinophilic granuloma. The child was discharged from the hospital but was readmitted shortly, showing pallor, anemia hepatomegaly, splenomegaly and an enlarged node in the right side of the neck. Treatment was unavailing, the child dying a few weeks later. Autopsy was not available, but the symptoms on readmission together with roentgen analysis, have led the authors to classify the case as one of Siwe-Letterer's disease.

RIASSUNTO

Descrive un caso di morbo di Siwe-Letterer in una bambina. Un tumore del diametro di 4 cm. venne rimosso dalla regione scapolare destra, dopo una diagnosi generica di tumore maligno. L'esame microscopico rivelo' le caratteristiche di un granuloma eosinofilico. La bambina venne dimessa dall'ospedale, ma vi fu riammessa poco dopo per anemia, epato- e splenomegalia, un nodulo linfatico nella parte destra del collo. Ogni cura fu vana : la bambina morì poche settimane dopo. Non fu possibile eseguire un'autopsia. L'A. classifica tuttavia il caso quale morbo di Siwe-Letterer in base ai sintomi clinici ed ai dati radiologici.

RÉSUMÉ

Rapport d'un cas de maladie Siwe Letterer chez un bébé de sexe féminin. Une tumeur de 4 centimètres, fut prélevée de la région de l'omoplate droite après un essai de diagnostic de tumeur maligne de l'omoplate, d'un type non déterminé. L'étude histopathologique de la tumeur révèla les traits caractéristiques du granulome eosinophilique. L'enfant quitta l'hôpital mais y fut ramenée peu de temps aprés avec des symptômes de pâleur, d'anémie, d'hépatomégalie et de grossissement d'un ganglion du côté droit du cou. Le traitement fut institué en vain, et l'enfant mourut quelques semaines après. L'autopsie ne fut pas executée mais les symptômes en plus des clichés radiologiques, ont conduit les auteurs à classifier ce cas comme maladie de Siwe Letterer.

RESUMEN

Se comunica un caso de enfermedad de Siwe-Letterer en una niña a la que se le había extirpado un tumor de 4 cm. de la región escapular derecha después de realizar un diagnóstico provisional de tumor maligno del omoplato.

El estudio histopatologico del tumor reveló las características de un granuloma eosinofílico. La niña fué dada de alta del hospital siendo readmitida poco después y mostrando palidez, anemia, hepatomegalia, esplenomegalia y un nodo agrandado en el lado derecho del cuello. El tratamiento no dió resultado, muriendo la niña semanas más tarde. No se practicó la autopsia, pero los síntomas, junto con los examenes roentgenograficos, han hecho que los autores clasificaran el caso como de enfermedad de Siwe-Letterer.

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2. Gross and Jacox.[1a]
3. Farber and Green.[1b]

Osteochondritis Dissecans of the Elbow

PHILIP WILLNER, M.D.*
NEWARK, N. J.

THE DIAGNOSIS of osteochondritis dissecans of the elbow can be made on the basis of the history and the physical examination but should be substantiated by roentgenograms. The condition is often erroneously diagnosed as "chip fracture of the elbow" because of the onset of signs and symptoms after trauma. The occurrence of osteochondritis dissecans has been considered unusual in the elbow, frequent in the knee and fairly common in the hip and ankle. Edward J. Kilfoy, in a review of the literature up to September 1941, found only 16 cases reported. There is a plethora of material on so-called chip fractures of the elbow, especially of the capitellum. An injury that can produce this type of fracture must be accompanied by a fracture or other damage to the articular cartilage of the head of the radius. The radius must be driven upward, delivering the force to the capitellum. The trauma would be severe and would be described as a "fall on the outstretched hand."

Osteochondritis dissecans is a joint disease in which a fragment of cartilage and underlying bone becomes detached from the articular surface. The cause is usually local circulatory impairment. The osteocartilaginous sequestra or sequestrae, extending into the joint, produce limitation of motion and synovial irritation, with a resultant increase in joint fluid. There may be one or more fragments arising from a common bed. It is usually a disease of adolescence or early adulthood.

The possibility of the occurrence of this condition in the elbow should be kept in mind. A history of pain following slight trauma or none, together with swelling, limitation of extension, increased fluid in the joint, bony resistance to extension and the presence of one or more loose bodies on careful palpation will lead to the diagnosis. Roentgenologic study will show the loose bodies and a defect in an articular surface. This defect may be present in the capitellum, the internal condyle, the head of the radius or the olecranon fossa. Surgical removal of the body or bodies is the treatment of choice.

REPORT OF CASE

J. S., a white boy aged 15, was admitted to the orthopedic clinic of the Monmouth Memorial Hospital. His chief complaint was of limitation of extension. About one year previously, while throwing a baseball, he felt pain and locking of his right elbow. He was told by his family physician to "work it out." Since that time he had noticed a gradual diminution of his ability to extend the elbow. He also noticed that on two occasions his elbow "caught" and became painful.

Physical Examination. There was effusion of synovial fluid over the posterolateral aspect of the right elbow. No increase of local temperature or tenderness over the swelling was observed. One loose fragment in the posterolateral surface of the elbow could be readily palpated. A tentative diagnosis of osteochondritis dissecans of the right elbow was made. The patient was sent for roentgen examination (Fig. 1). He was admitted to the hospital and operated on four days later.

Operative Observations.—Under a tourniquet, an arthrotomy of the right elbow was performed, with use of a small lateral incision between the external condyle and the head of the radius. The supinator muscle was divided and the capsule opened. Approximately 20 cc. of clear synovial fluid escaped when the capsule was opened. Two loose cartilaginous foreign bodies were found and removed, one measuring ⅜ by ⅝ inch (1.1 by 1.3 cm.) and the other approximately ⅛ by 1/16 inch (0.08 by 0.16 cm.). The articular surface of the radius was normal. The bed from which these joint mice came was a large eroded surface in the center of the articular surface of the capitellum. The frayed cartilage around the circumference of the bed was moved and the bed curetted down to freshly bleeding bone. The incision was closed in layers, interrupted cotton sutures being used for the capsule and the subcutaneous tissue and continuous cotton sutures for the skin. Compression dressing of mechanics' waste was applied. The tourniquet was released.

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Diplomate, American Board of Orthopedic Surgery.

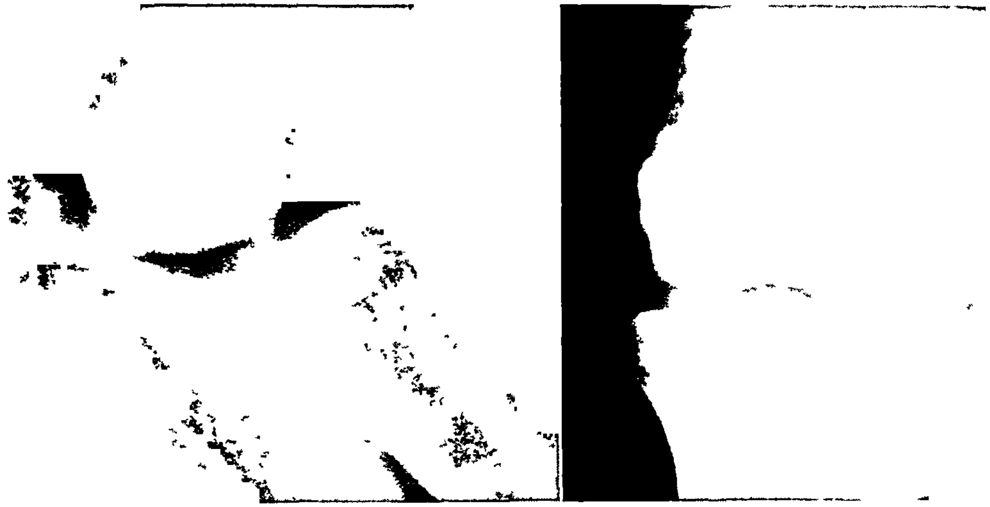

Fig. 1.—Roentgenograms in case of osteochondritis dissecans of elbow.

SUMMARY

A case of osteochondritis dissecans of the elbow in a boy aged 15 is reported. The occurrence of this condition in the elbow is rare, and, since the signs and symptoms frequently appear after trauma, a diagnosis of "chip fracture" is often made. In the author's opinion the possibility of osteochondritis dissecans should be kept in mind. Pain (with or without recent trauma), swelling, limitation of extension, increased fluid in the joint, bony resistance to extension and the presence of one or more loose bodies on careful palpation will lead to the diagnosis. Roentgen examination is an important diagnostic aid.

RIASSUNTO

Descrive un caso di osteocondrite dissecante del gomito in un ragazzo di 15 anni. Si tratta di un'evenienza relativamente rara, facilmente confusa con uno scheggiamento dell 'osso dato che i sintomi ed i segni obbiettivi ricorrono spesso dopo un trauma. La possibilita' di un'osteocondrite dissecante dovrebbe essere tenuta sempre presente. Dolori (con o senza la storia di un trauma recente), gonfiore, limitazione e resistenza ossea ai movimenti di estensione, aumento del liquido articolare, presenza di uno o piu' corpi liberi alla palpazione, conducono alla diagnosi. L'esame radiografico e' naturalmente un importante sussidio diagnostico.

RÉSUMÉ

Un cas d'ostéochondrite dissécante du coude chez un jeune homme de 15 ans est présenté. Cet état n'affecte que rarement le coude et, comme les symptômes apparaissent d'ordinaire

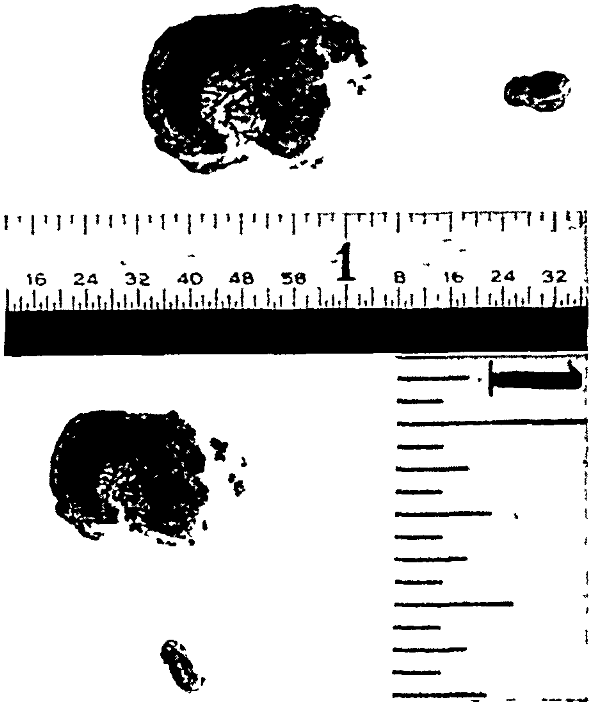

Fig. 2.—Operative specimens.

après un traumatisme, le diagnostic de "fracture éclat" est souvent fait à tort De l'avis de l'auteur, on devrait garder à l'esprit la possibilité de la présence de l'ostéochondrite dissécante La douleur (suivant ou non un traumatisme récent) l'enflure, l'extension limitée du membre, une augmentation sereuse dans l'articulation, une résistance osseuse à l'extension et la présence d'une ou de plusieurs billes cartilagineuses découvertes par palpation méthodique conduira au diagnostic L'examen radiologique est un auxiliaire important pour poser le diagnostic

RESUMEN

El autor comunica un caso de osteocondritis disecante del codo en un muchacho de 15 años La localización de este proceso en el codo es rara y como los signos y síntomas aparecen frecuentemente después de un traumatismo se hace con frecuencia un diagnóstico equivocado A juicio del autor debe tenerse en cuenta la posibilidad de ósteocondritis disecante

El dolor con o sin traumatismo reciente, inflamación, limitación de la extensión, aumento de fluidos en la articulación, resitencia ósea a la extensión y existencia de uno o mas cuerpos sueltos, observables a la palpacion, permite el diagnóstico El examen roentgenografico es un importante medio de ayuda diagnóstica

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Forthcoming Assemblies

of the

International College of Surgeons

will convene as follows:

Seventh International Assembly, Buenos Aires, Argentina, August 1 5, 1950

Fifteenth Annual Assembly, United States Chapter, Cleveland, Ohio, October 31-November 3 inclusive, 1950

Sixteenth Annual Assembly, United States Chapter, Chicago, September 11-14 inclusive, 1951

Seventeenth Annual Assembly, United States Chapter, San Francisco, California, October 28 31 inclusive, 1952

For further information, please address

Secretary

1516 Lake Shore Drive
Chicago 10, Illinois

Editorial

Gentleness and Skill in Surgery

Sir William Ogilvie, in his new book *Surgery Orthodox and Heterodox,*[*] points out in an unforgettable manner how recent, comparatively speaking, is our recognition of the fact that a surgeon's capacity for gentleness is one of his prime professional assets. "Gentle handling is recognized today as the aim of every surgeon. . . . Most of the older surgeons were men of action rather than of thought, as they had to be before anaesthesia or antiseptics were known. The tales that come down to us are of uncouth choleric men, of retorts whose discourtesy has made them classic, of bold and skillful but brutal manipulations, of blood and agony, of boastful self-assertion, of fierce quarrels, of chicanery and nepotism. . . . Bold and untried adventures, such as the early explorations of the abdomen, could only be carried through successfully, at a time when anaesthesia was still understood imperfectly and shock not at all, by surgeons who worked at lightning speed. We therefore find that during the first part of this century the ultrarapid operator was undisputed king of surgery, or, at any rate, of surgical practice."

Admitting in all justice that these same surgeons, though they "slashed their way through tissues in a manner that would horrify a student of today," nevertheless demonstrated that certain operations were possible and that the patient could survive them, Sir William expresses the opinion that the worst is over. "During the last decade, operating by the clock has become a bad joke, traumatic muscle cutting and nerve-damaging incisions in the abdominal wall have disappeared, haemostasis has become universal, and strong antiseptics, purgation and starvation have been abolished from the surgical ward. . . . The day is clearly not far distant when all operations will be done with the unhurried exactness of the surgeon-neurologist, when all scars will be the invisible line of the plastic surgeon. For the beautiful scar is more than a work of art. . . . It is the signature of the gentle surgeon." The skill that enables the surgeon so to autograph his work is dealt with in an admirable chapter on surgical handicraft.

There can be no doubt that gentleness and skill combined are of priceless value—to the surgeon as satisfying at once his artistic and his humanitarian conscience, and to the patient as proof of the fact that his confidence is not misplaced.

That the patient should have no doubts on this score is important, for the value of gentleness and skill extend both before and after the operation. The world has only recently begun to learn how intimate is the affinity of body and mind. The surgeon, accustomed as he is to thinking in scientific terms, has constant need to remind himself that the tissues he mends are human and that a very human, pathetically uncertain and extremely sensitive human entity quivers within them. The surgeon himself is human and may err. It is no light matter for one human being to place his very existence in the hands of another, and a surgeon who never forgets this is apt to be gentle.

Immeasurable harm, both physical and psychic, can be done by a rough or a careless approach. Immediately before and immediately after every operation, even though all goes well, there is a period during which the patient requires all possible reassurance. Who, if not the surgeon, is to supply it? These are the hands in which he has laid his life—for better or worse, he does not yet know which—and no other hands will do for him to cling to. Anyone who has walked down hospital corridors, if he is observant in the slightest degree, has seen how eagerly the eyes of surgical patients light up at the sound of approaching footsteps, and how plainly they show their disappointment if it is not the operating surgeon who approaches If the operation is still to come, they want to see him once more and take hope of his hope confidence of his confidence, warmth of his human warmth, if it is over, they want him to share their wonder that it is done and well done that life remains and health is just around the corner

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[*] Thomas, 1950. Reviewed in this issue.

Can we disregard this dependence while human hearts beat within us? Can we ignore the responsibility that lies upon us to perfect ourselves in skill and train ourselves in patience?

For patience as any surgeon of experience knows, is often sorely needed and hard to achieve The neurotic or hysterical patient the terrified patient, the hostile patient and the patient with a chip on his shoulder are familiar figures to us all Knowing as we do how strongly the state of mind may affect the outcome, we tend to forget that they do not know it at all, and will know it no better for telling a thousand times The mind of the average patient awaiting surgical treatment or just recovering from it is in no condition for learning Even the highly intelligent and cooperative patient can try our souls at times

Yet patience is the foundation stone of gentleness here as elsewhere In the training of interns few elements are more important and few, unfortunately, are so little emphasized Many a patient whose operation has gone well has been seriously upset during early convalescence by the well meant but bumbling attentions of the inexperienced It must be remembered that in the mind of the surgical patient all attitudes are exaggerated, the slightest roughness is tantamount to mayhem, brusqueness of manner becomes deliberate brutality, a casual approach means indifference, a show of confidence is "cocky" Could a way be found to teach patience in the lecture room, these handicaps to recovery would be avoided, and even though this is probably not within the sphere of possibility, the seeds of its later growth can and should be planted

The other foundation of gentleness is strength, and in surgery, perhaps more than in any other field of human endeavor, strength is born of skill The surgeon who has brought his technical competence to a high level is strong in the knowledge that he has done so and can therefore afford to be both patient and gentle Every time he succeeds, and in direct proportion to the amount of blood, sweat and tears with which the success is accomplished, his strength for future encounters with human frailty will increase He can count upon this as surely as upon the rising and setting of the sun And when he reaches a point at which patience and skill are as natural to him as breathing, he will have neither time nor inclination to count the cost

M T

Portrait of a Physician

> The Doctor walked among the terrors with a steady head No man better known than he, in Paris at that day, no man in a stranger situation Silent, humane, indispensable in hospital and prison, using his art equally among assassins and victims he was a man apart He was not suspected or brought in question any more than if he had indeed been recalled to life or were a spirit moving among mortals — Dickens, *A Tale of Two Cities*

New Horizons

By the Editor

Dress and Disease

Some philosopher has remarked that no woman ever caught cold on a day when she thought herself well dressed. Whether this statement can be proved is uncertain, but there is no doubt whatever that from time immemorial the subject of dress has been endlessly discussed from both the pathologic and the therapeutic point of view. All down the centuries, every successive change in the style of wearing apparel has brought forth learned discourses and professional diatribes, based on a list of theories that would require an encyclopedia to enumerate. These tenets range from the idea that scanty garments, especially children's ankle socks, are the cause of colds, bronchitis and pneumonia to the quaint but still widely accepted notion that a necklace containing a lump of asafoetida in a muslin bag will ward off disease in any form.

The late Logan Clendening, one of the most ebullient spirits ever to saunter across the medical landscape, made a collection of doctors' writings on dress. The most striking characteristic of this collection, he said, was its monotony. Whether the change of style occurred in 1700 or in the twentieth century, the doctors' plaints did not vary; all prophesied doom.* One article on the list was entitled "The Bacterial Content of Undershirts." Others respectively stated that belts damage the viscera, that going bareheaded prevents alopecia and, in direct contradiction of the earlier school of thought, that colds, bronchitis and pneumonia are due to overdressing (in the quantitative sense of the word).

Tight lacing, of course, brought forth the most violent screeds. "Thirty-five years ago," said Dr. Clendening, writing in 1931, "they had a term 'corset liver'. . . . I had not thought of the disease for two decades until about a year ago, when I saw the autopsy of an old woman who had a liver nearly pinched in two, with one lobe hanging clear down into her pelvis. Inasmuch as she was nearly seventy-five years old at the time of her demise, had a large family of children and grandchildren, and died from being hit by an automobile, I judge the 'corset liver' did not really do so much harm. . . . Nowadays, so far as I can find out by palpation, women do not wear any corsets at all."

Dr. Clendening refrained, perhaps wisely, from following his predecessors' example and drawing conclusions. One conclusion, however, may be safely drawn: that *homo sapiens*, including the feminine component thereof, is on the whole a sturdy and durable species and that changes in clothing style, however radical, are not likely to destroy the race.

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*The Care and Feeding of Adults. Garden City Publishing Company, 1931.

UNO Studies Opium Control

The United Nations Organization has proposed and planned an international agreement for control of the distribution of opium and its derivatives throughout the world. The plan involves an international governmental monopoly of these products, with tentative production quotas for the major opium-producing countries, including India, Iran, Turkey, Russia and Yugoslavia. An Ad Hoc Committee met at Ankara, Turkey, in November and December to study the problem and set up a framework of practical procedure.

This enterprise, of course, is not a new one. Says the UNO release, "The League of Nations worked for many years on the problem of limiting the annual production of raw opium to that required for the medical and scientific needs of the world, and its plans for bringing the production of this important narcotic raw material under international control had reached an advanced stage when the second World War broke out" Shortly after the end of World War II the United Nations took up the task, and the Ad Hoc Committee has now reached unanimous agreement as to the terms proposed An interim is suggested to enable governments to put their production regulations into effect According to this agreement government opium monopolies would be operated by an approximately uniform pattern in all participating nations

On the international level an international purchase and sale agency would be created to integrate and strengthen the individual national monopolies and eliminate overproduction which at present makes possible the clandestine production and sale of narcotic drugs This agency would be required to buy each year from the respective national monopolies their total production of opium over and above that required for national medical and scientific use The national monopolies in turn would be required to sell *only* to the international agency, which would then have a monopoly in the legitimate trade

These proposals will eventually be submitted to the Commission on Narcotic Drugs and the Economic and Social Council It is to be hoped that some such effective means of narcotic control can be permanently established for the need has long been recognized as urgent It is obvious that too many loopholes can still be found by unscrupulous producers and sellers of opiate preparations The effectiveness of the UNO proposal of course if it goes into effect, will depend on the thoroughness with which these loopholes are blocked, but the principles underlying the effort are sound and sincere As with all such undertakings the details of arrangement are doubtless undergoing constant review, expansion and amendment and this particular Rome will not be built in a day Its conception, nevertheless is another heartening evidence of the world s awakening to the claims of science, the essential nature of commercial integrity and social justice and the all encompassing need of international cooperation

He is a fool who cannot be angry, but he is a wise man who will not —*Anon*

Exactness in little things is a wonderful source of cheerfulness —*Faber*

What is a trifle? A hole is nothing at all and yet you may break your neck in it
—*O'Malley*

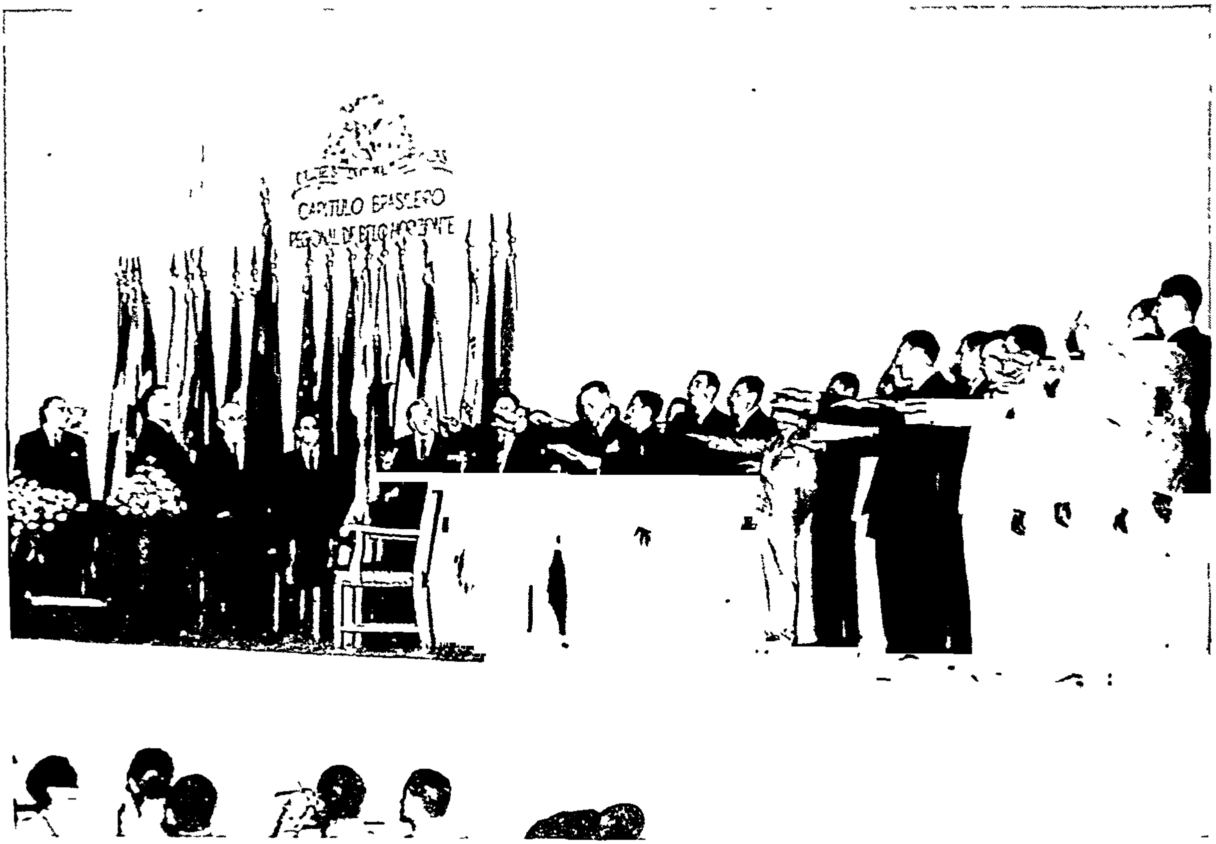
Chapter News

The **Brazilian Chapter** of the International College of Surgeons was organized on September 30, 1949, at a formal meeting of the Brazilian members of the College, held in the Public Library in São Paulo. The following officers were elected:

President	Prof. Dr. Carlos Gama, F.I.C.S. Professor of Neurosurgery, University of São Paulo
President-Elect	Dr. José Avelino Chaves, F.I.C.S. São Paulo
Vice-President	Dr. Sebastião Hermeto Junior, F.I.C.S. São Paulo
Secretary	Dr. Virgilio Alves Carvalho Pinto, F.I.C.S. São Paulo
Ass't Secretary	Dr. José Americo Soares Baptista, F.I.C.S. São Paulo
Treasurer	Dr. Eurico Branco Ribeiro, F.I.C.S. São Paulo
Ass't Treaurer	Dr. Oscar Cintra Gordinho, F.I.C.S. São Paulo

During the eight months following that first meeting and election of officers, the membership of the Brazilian Chapter has increased to approximately 250 Fellows and Associates, and fifteen Surgical Sections have been organized throughout the country, each with its own Regent, as follows:

Rio de Janeiro, D.F.	Prof. Dr. Gustavo Gouvêa
Salvador, Bahia	Dr. Fernando Luz Filho
Recife, Pernambuco	Dr. Luiz Tavares Silva
Porto Alegre, Rio Grande do Sul	Prof. Dr. Guerra Blessmann
Belo Horizonte, Minas	Prof. Dr. Lucas Machado
Curitiba, Paraná	Prof. Dr. Mario de Abreu
Central Brazil (Triangulo Mineiro)	Dr. Elpidio V. Cannabrava
Londrina, Paraná	Dr. Jonas Castro Pinto
Campinas, São Paulo	Dr. Manoel A. Marcondes Filho
Santos, São Paulo	Dr. A. Domingues Pinto



Initiation of new members of the Brazilian Chapter of the International College of Surgeons at the Convocation held by the Surgical Section of Belo Horizonte.

The Governor of Minas Gerais, Milton Campos (left) presenting diploma to Prof Rivadavia Gusmao of the College of Medicine, Belo Horizonte To extreme left, Prof Dr Carlos Gama, President of the Brazilian Chapter

Fortaleza, Cereá	Dr Newton T Gonçalves
Maceió, Alagôas	Dr Ib Gato Marinho Falcão
Juiz de Fóra, Minas Gerais	Dr Roão Ribeiro Villaca
Ribeirão Preto	Dr Luiz Tinoco Cabral
Victoria, Espirito Santo	Dr Affonso Branco

Four of these Surgical Sections have held meetings and elected their own officers, holding a solemn installation ceremony and convocation for the members of that Section

On March 26, 1950, in the auditorium of the Historical Institute in Salvador, the formed installation of officers of the Surgical Section of Bahia was held The following officers were installed

President	Dr Fernando Luz Filho
Vice-President	Dr Benjamin da Rocha Salles
Secretary-Treasurer	Dr. Leonidas Cortes

After an address by Dr. Luz, the President of the Brazilian Chapter, Prof. Carlos Gama, spoke of the aims of the International College of Surgeons and of plans for the future activities and growth of the Brazilian Chapter He then expressed regret that Prof. Calmon, Dean of the University of Brazil, was unable to attend the meeting, owing to unforeseen circumstances, and read his message to the Surgical Section of Bahia

In connection with the meeting in Bahia, the members of the College and their wives were entertained at a dinner dance at the Boite Oceania and at a breakfast given by Dr. and Mrs Fernando Luz Filho

After Prof. Calmon's address, Dr. Oscar Cintra Gordinho, Assistant Treasurer of the Brazilian Chapter, spoke on the teaching and practice of medicine in Brazil

Convocation ceremonies were held, with presentation of diplomas to new members of the Brazilian Chapter.

On April 1, an electon of the following officers and solemn installation ceremonies were held in Belo Horizonte, Minas Gerais, with Milton Campos, Governor of the State of Minas Gerais, as guest of honor.

President	Prof. Dr. Lucas M. Machado

Prof. Dr. Carlos Gama, President of the Brazilian Chapter, addressing the Surgical Section of Bahia. Dr. Fernando Luz Filho immediately to his left.

Vice-President	Dr. José Bolivar Drumond
Secretary-Treasurer	Dr. Silvio Miraglia

His Excellency the Governor addressed the meeting, welcoming the visiting surgeons to Belo Horizonte and congratulating the Surgical Section upon its organization. Prof. Dr. Carlos Gama then read a paper on "New Procedures in Neurosurgery."

By unanimous vote, Prof. Dr. Borges da Costa, Dean of the College of Medicine of the University of Minas Gerais, was elected to Honorary Fellowship.

The Convocation was then held.

On April 3 the Surgical Section of Londrina, Paraná, held an election and installed the following officers:

President	Dr. Jonas de Faria Castro
Vice-President	Dr. Caio de Moura Rangel
Secretary-Treasurer	Dr. Waldemar D. V. Palazzo

Recently the Surgical Section of Ribeirão Preto held its election and inauguration ceremonies, the following officers being chosen:

President	Dr. Luiz Tinoco Cabral
Vice-President	Dr. Geraldo Avelino da Silva
Secretary-Treasurer	Dr. Pedro Cerqueira Falcão

An election of officers for the Surgical Section of Rio de Janeiro has been held. Installation ceremonies will take place in the near future.

President	Prof. Dr. Gustavo Gouvea
Vice-President	Dr. Jorge Beral Sardinha
Secretary-Treasurer	Dr. Leonidas Cortes

Prof. Dr. José Rábago, F.I.C.S., Regent of the **Mexican Chapter** of the International College of Surgeons, and Ex-President of the Mexican Association of Gynecology and Obstetrics, represented this Association at the Seventh Argentine Congress of Gynecology and Obstetrics which was held in Buenos Aires. Prof. Rábago also gave a series of lectures in Caracas at the invitation of the Venezuelan Society of Obstetrics and Gynecology.

The following members of the Mexican Chapter of the International College of Surgeons will serve on the Board of Directors (1950-1952) of the Mexican Academy of Surgery:

Vice-President: Prof. Raúl A. Chavira, F.I.C.S., President of the Mexican Chapter.

Director of Publications: Prof. Dr. Miguel López Esnaurrizar, F.I.C.S., (Hon.), National Regent of the Mexican Chapter.

Members of the Board of Directors: Prof. Dr. José Rábago, F.I.C.S., National Regent of the Mexican Chapter.

Prof. Dr. Bernardo J. Gastélum, F I C S

Dr. Víctor Fernández Manero, F I C S, former Director of the Department of Public Health of Mexico, has been appointed Ambassador from Mexico to France.

Dr. Esteban Paulín, F.I.C.S, Querétaro City, member of the International Board of Trustees, of the International College of Surgeons, has been elected President of the Medical Association of Querétaro.

Dr. Teódulo Agundis, Jr., M.I.C.S., has been elected President of the Mexican Society of Ophthalmology.

The **Fourth Peruvian Congress of Surgery** was held in Lima, Peru, under the auspices of the Peruvian Government and organized by the Peruvian Academy of Surgery. Many members of the Peruvian Chapter of the International College of Surgeons served on the Organization Committee which was appointed by the Peruvian Academy of Surgery.

A Message from the President of the College

In the evolutionary process of science each generation has its historic mission. Surgery has passed down the centuries through several stages—the heroic, the anatomic and the pathologic; in our times it has advanced into a full physiologic age and is inspired with a holy respect for biologic power. The paramount aim of surgeons today is to restore physiologic function.

In the world of science, as in other phases of history, the first to appear were the great pioneers, then the doctrines, the methods and the systems, which are always changing, modifying and replacing themselves, always leaving a residium of eternal truth which is the essence of all scientific progress.

Past generations fulfilled their task of raising surgery to the summit of clinical and technical efficiency. It is the task of our generation to integrate all the ideas; to be the critics of any inspiring trends and of their results; and to establish laws and codes to rule research and the practice of universal surgical science.

This stage of progress has demanded the foundation of agencies endowed with authority, prestige and the indispensable elements of success in establishing connections throughout the world. To fulfill this duty, the International College of Surgeons was founded fifteen years ago. More recently, the World Medical Association was organized.

The surprising growth and development of the International College and its increasing influence in the scientific world are the most eloquent justification of its existence and the surest guarantee that its historic mission, before history, will be magnificently carried out. And once again, before the scientific world, it is fitting to state that any glory in this achievement is to be credited to its Founder, Max Thorek, whose foresight, talent, self-denial and enlightened tenacity have made it possible. Providence has rewarded his efforts by allowing him to contemplate, while still in full pursuit of his scientific activities, the complete realization of the ideal to which he has devoted the best of his life.—Francisco Graña, M.D., F.A.C.S., F.I.C.S. (Hon.)

United States Chapter

Secretary's Report: Dr. Arnold Jackson, secretary of the United States Chapter, attended the meeting of the Florida Surgical Section in March, 1950. A dinner at Miami Beach was arranged by the members of the Section and presided over by Dr. George Ferré, Regent of the United States Chapter for Florida. Dr. Ferré reported that the heads of nearly all surgical sections of Florida hospitals are now members of the College.

On April 1 Dr. Jackson attended a scientific meeting of a group of surgeons of Colorado and Wyoming and a dinner given in his honor. Regent Kenneth Sawyer and Dr. Albert Metcalf of Denver and Regent Andrew Bunten of Cheyenne also *participated.*

During his travels in the interest of the College the Secretary had important conferences with Dr. Robertson Ward, Regent of the Northern California Section, at San Francisco, and many others. While in San Francisco he leased the Auditorium for the 1952 Assembly of the United States Chapter.

In his report to the Executive Council Dr. Jackson said, "It is my privilege to know all these splendid men, most of whom I have met through the College. I shall be forever grateful for the opportunity to establish these fine associations."

A forthcoming issue of the Journal, he added, will contain pertinent facts concerning the Fifteenth Annual Assembly of the United States Chapter, to be held in Cleveland, Ohio, from Oct. 31 to Nov. 3, 1950. The highlights of the program will be listed. At the banquet the guest speaker will be Dr. Frank Lahey (Lahey Clinic, Boston), who will address the Assembly on "Some Recent Advances in Surgery." Reservations for the banquet should be made promptly and may be obtained through Dr. Chester W. Trowbridge, Banquet Chairman, International College of Surgeons, 1516 Lake Shore Drive, Chicago 10. Hotel reservations may be made by writing to the Committee on Hotels, at the same address.

Announcements: The next examinations for Certified Fellowship to be given by the International Board of Surgery will be in General Surgery and Proctology and will be held at 1516 Lake Shore Drive and Cook County Hospital, Chicago, Sept. 8 and 9, 1950.

A committee has been appointed to clarify the qualifications for Certified Fellowship in the United States Chapter.

Miss Alma D. Case has been appointed Executive Secretary of the United States Chapter.

Dr. W. P. Nicolson, Regent for the State of Georgia, announces that there will be a meeting of the Southern Surgical Section of the United States Chapter in Atlanta on Jan. 11, 12 and 13, 1951.

Exhibits: The United States Chapter will present an exhibit at the forthcoming meeting of the American Medical Association, June 26-30, in San Francisco. All members who attend are urged to visit the booth, which will be in charge of Miss Case.

Members of the Chapter who wish to show personal scientific exhibits at the International Assembly should communicate with the Exhibit Secretary, International College of Surgeons, 1516 Lake Shore Drive, Chicago 10, Ill.

Member Activities: The following members of the United States Chapter attended the Second Annual Assembly of the Italian Chapter at Venice and Padua, June 1-3, 1950: Dr. Max Thorek, Chicago; Dr. Donald Dickerson, Danville, Ill.; Dr. John B. Farley, Pueblo, Colo.; Dr. Bernard J. Ficarra and Dr. Morris Weintrob, Brooklyn, N.Y.; Dr. Anton P. Randazzo and Dr. Abe Dobrin, Passaic, N. J.; Dr. Aldo Sala, Clifton, N. J.; Dr. Earl Campbell, Chattanooga, Tenn., and Dr. R. Lucian Hamilton, Marysville, Calif.

Dr. Custis Lee Hall, President of the United States Chapter, visited Cuba recently in the interests of the College.

Dr. Henry W. Meyerding, President-Elect of the United States Chapter, has been invited to deliver a series of lectures in Sao Paulo, Brazil.

Dr. Bernard J. Ficarra of Brooklyn, N. Y., was recently decorated by the Vatican with the Order of Chevalier de la Grande Croix.

Dr. Moses Behrend and a selected group of members of the United States Chapter assisted at the funeral services for the late President Victor Manuel Román y Reyes, of Nicaragua, Honorary Fellow of the International College of Surgeons and brother of Dr. Desiderio Román, Fellow and Past President of the United States Chapter and the International College of Surgeons.

Dr. Louis J. Gariepy of Detroit is the author of *Saw-Ge-Mah* (Medicine Man), a novel recently published by the Northland Press of St. Paul.

Dr. Suren H. Babington of Berkeley, California, is the author of *Navajos, Gods, Tom-Toms,* published by Greenberg of New York.

Special Note: *All United States Chapter news should be transmitted to the Chapter Secretary for inclusion in these columns.*

New Books

Surgery, Orthodox and Heterodox By William H. Ogilvie, K B E , D M , M Ch , F R C S , F A C S (Hon), F R C S (Canada), F R A C S (Hon) Springfield, Ill . Charles C Thomas, Publisher Pp 241

In one of the most thought provoking volumes to appear in recent years, Sir William Ogilvie sets forth his personal creed as a surgeon and his experiences in living by it With regard to the philosophy of surgery, so to speak, the book is stimulating in the extreme It abounds with quotable epigrams, engaging anecdotes and apt comparisons The chapters comparing surgeons and surgical methods in Great Britain with those of the Continent and of the United States are highly illuminating and entirely without prejudice

This book is in no sense a textbook and yet there is a great deal to be learned from it, not only by Sir William's colleagues in surgery but by the general public Its easy style and its wealth of anecdotal material make it good reading for the lay [illegible] For the professional reader, chapters of great interest deal with surgical diagnosis, delay in operation, clinical surgery, the physiologic basis of surgical technic, manual skill in surgery, war surgery and the early diagnosis of cancer A short but memorable essay entitled "Truth" concludes the volume

M T

Pathology and Surgery of Thyroid Disease By J L DeCourcy, M D , and C DeCourcy, M D Springfield, Ill Charles C Thomas, Publisher, 1949

Despite recent developments in the field of the antithyroid drugs and radioactive iodine, the Drs DeCourcy believe that thyroidectomy is still the most satisfactory method of treating toxic goiter In their excellent book these authors stress particularly the pathologic and surgical phases of the subject and emphasize less the diagnostic and clinical aspects For instance, little attention is paid to the importance of Plummer's quadriceps loss test or to the characteristic blood pressure phenomena in diffuse hyperplastic and toxic nodular goiter. Nor is mention made of the typical " purposeful movements without purpose," a symptom observed in the nervous patient with exophthalmic goiter

What this book fails to bring out from the diagnostic standpoint it more than compensates for by a thorough presentation of the pathologic and surgical aspects Contrary to the generally ac[illegible] idea that in Riedel's thyroiditis the primary fibrosis occurs within the gland, the DeCourcys suggest that the disease begins as a perithyroiditis and that the fibrosis starts from without the gland There is an excellent chapter on iodine and, in particular, on blood iodine studies As regards radioactive iodine, there is a complete review of the work on this subject to date, but it is believed that this agent will prove more useful in the location of aberrant thyroid tissue or metastases from cancerous glands The latter subject, one that is receiving so much attention whenever thyroidologists assemble, is well covered The chapters on preoperative and postoperative care and surgical technic are well presented

The chief value of this splendid work is that it summarizes most of the theories and work done on this growing subject in the past, adds an excellent digest of the authors' own extensive experience, and brings up to date the most recent developments in this field It is a book that anyone concerned with the subject of thyroid disease will read with interest and profit

A S J.

Medicine of the Year Edited by John B. Youmans, M D , Dean, School of Medicine, Vanderbilt University Philadelphia. J. B Lippincott Company, 1950, p 204

The second issue of this annual evaluation of medical progress presents the year's outstanding developments in procedures, technics and trends The fields of internal medicine, psychiatry, obstetrics and gynecology, pediatrics, general surgery and their subdivisions are ably covered by clinicians and teachers from various parts of the country Twenty two nationally known authorities study the year's developments in their own field and present their observations in narrative style

An unusual departure from time honored custom is the presentation of a summary of each section, italicized, at the beginning of each chapter By means of this summary one can determine quickly what portion of the chapter he most desires to read

The presentations are concise and factual The book is highly recommended to the general practitioner, to whom it will supply much valuable information. It will also aid the specialist in keeping abreast of progress in his own and other fields of specialization [illegible] edical progress and modern technics

Thrombosis of the Lower Extremities. By E. A. Edwards, M.D. Springfield, Ill.: Charles C Thomas, Publisher, 1950.

This is publication number forty-one in the American Lecture Series. From the point of view of the printer's art, this small volume, like all others in the series, is excellent. The topic of thrombosis of the lower extremity is perhaps less appealing than other topics in this series; nevertheless, it is one of great importance.

As in all discussions of this type, the most important aspect is the treatment of these distressing vascular disturbances of the lower extremities. In the author's experience immediate lumbar sympathectomy is the most significant single item of treatment available today. It is gratifying to note his accentuation of the fact that there are definite limitations to conservative treatment. Often an early amputation will save the life of a patient with thrombosis in a major vessel of the lower extremity.

The volume is especially recommended for those interested in peripheral vascular disease.

B.J.F.

Thrombosis and Dicumarol: By S. Shapiro, M.D. and M. Weiner, M.D. New York: Brooklyn Medical Press, 1949.

The seriousness of thromboembolic disease warrants the publication of any investigation that may assist in the management of this physiopathologic entity. Hence, the appearance of this book is to be welcomed. The authors do not intend their text to be a complete review of this vast subject. Their purpose is to bring the reader abreast of the current theoretical and practical knowledge concerning thrombosis, hemorrhage and anticoagulant therapy.

The material included an amalgamation of date on the clinical and laboratory aspects of this problem. There is an appendix on related laboratory procedures.

B.J.F.

Acute Laryngotracheobronchitis. By A. Harry Neffson, M.D. New York: Grune and Stratton, Inc., 1949.

In this book the author gives a good account of a disease which is certainly not a clinical entity, but rather a symptom complex.

He stresses the fact that there is still need for agreement on an all-inclusive term for nondiphtheritic acute infectious obstructions of the laryngotracheobronchial airway, including "(*a*) specific anatomic subdivisions indicating the extent of the involvement, (*b*) the causative organism, and (*c*) a pathologic description of the cause of the obstruction."

The book contains valuable information, based on the rich experience of the author, about handling all possible complications of this entity.

Neffson stresses the importance of the teamwork of practitioner, pediatrician and endoscopist in the successful treatment of the unfortunate victims. He is strongly in favor of handling such persons in institutions perfectly equipped for all kinds of emergencies.

The chapter "Intubation versus Tracheotomy" is especially interesting, with all the advantages and disadvantages of each carefully noted.

An extensive bibliography concludes this excellent book, which should be a good guide for all physicians who encounter this condition frequently in their practise.

E.L.D.

Actualités Chirurgicales (Surgical Facts). Edited by Jean Quénu, Professor, Clinique Chirurgicale de L'Hospital Cochin, Paris: G. Doin et Cie, 1949.

This is a well rounded edition covering a number of important fields in surgery and presenting well substantiated articles by twenty authorities. The several chapters deal with: (1) the organization of a blood bank at the Cochin Hospital in Paris; (2) postoperative venous thrombosis of the lower limbs and pulmonary embolism, including a discussion of early diagnosis and active treatment; (3) typhic osteoperiostitis; (4) central medullary nailing of diaphysial fractures; (5) semeiotic value and treatment of the hiccup in cases of digestive disease; (6) anemia associated with diaphragmatic hernia of the stomach; (7) surgical treatment of cancer of the middle thoracic portion of the esophagus; (8) surgical treatment of cardial cancer; (9) 500 gastrectomies in cases of ulcer, with a study of the operative mortality; (10) observations on tuberculosis of the cecum and colon, based on 10 operations; (11) the place of total colectomy in treatment of diseases of the large intestine; (12) cancer of the transverse colon; (13) multiple hydatid cysts of the abdomen; (14) cancer of the ampulla of Vater, its diagnosis and therapeutic indications; (15) disturbances resulting from removal of only one ovary; (16) vaginal fibromas; (17) postmenopausal hematometria; (18) primitive retroperitoneal tumors, and (19) the recidivation of inguinal hernia.

Prof. Jean Quénu has compiled these different studies most capably, achieving a publication of great importance. The volume is well illustrated and sets a high standard. V.C.

Abstracts from Current Literature

Relief of Pain in Rheumatoid Arthritis with Tetraethyl-Ammonium Bromide

Howell, H. Lancet 1: 204, 1950

This well known ganglion blocking agent has been used for some time to treat peripheral vascular diseases. The author has found it of value in relieving the pain from some types of muscle spasm associated with rheumatoid arthritis. It appears to be most effective in the acute phases of the disease.

M. T. FRIEDELL, M.D.

Treatment of Hiatus Hernia in Older Persons

Pickhardt, O. C., Ratsky, H. A. [illegible] F. H., J.A.M.A. 142: 310, 1950

The authors present a series of [illegible] patients ranging in age from 50 to 86 years, all of whom had hiatus hernias. The symptoms presented were epigastric and thoracic pain, gastric distress, vomiting, hematemesis, melena and dysphagia. Associated diseases were ulcer (1 peptic [illegible]) [illegible] anemia, cardiovascular diseases [illegible] of the stomach with and without obstruction [illegible] the colon. Treatment consisted [illegible] crushing the left phrenic nerve, which was [illegible] in 24 cases, by partial excision [illegible] in 2. In 6 patients who had [illegible] the crushing procedure a second [illegible] was required. Improvement [illegible] 1 of the cases after complete [illegible] tained. The patient in this [illegible] improvement. The authors [illegible] advisable [illegible] advocate left phrenic nerve interruption in hiatus hernia in older persons with or without incarceration or obstruction, when symptoms [illegible] pain, bleeding, pressure or ulceration are present.

Ho[illegible] S. Ste[illegible], M.D.

Late Spontaneous Rupture of the Extensor Pollicis Longus Tendon Following Colles' Fracture

Weinberg, E. D., J.A.M.A. 142: 979, 1950

Dysfunction of the thumb following Colles' fracture may be the first indication of disruption of the extensor pollicis longus tendon. In the majority of cases there are no premonitory symptoms, although prior to rupture there may have been a sensation of weakness or soreness accompanied by inability to pick up small objects.

To the 27 cases of this entity recorded in the literature up to 1932 Weinberg adds 3 cases from the Johns Hopkins Hospital in which the condition was treated by surgical repair.

Since rupture of the extensor pollicis longus tendon has occurred in nondisplaced fractures, the logical explanation of partial laceration at time of fracture is insufficient.

In such cases it must be assumed that the delayed tendon rupture is the final result of decreased blood supply consequent upon trauma, thrombosis, edema and hemorrhage in any conceivable combination.

In the 3 cases reported by Weinberg the rupture occurred on the eighteenth, thirtieth and thirty-fifth days. McMaster, in a larger collected series, stated that the rupture tends to occur between the third week and the third month.

Diagnosis is not difficult. The patient cannot extend the distal phalanx of the thumb, which droops as a whole. The ulnar border of the "anatomist's snuff box" disappears, and the retracted ends of the tendon may be palpated. There are no sensory changes, and the tendon does not respond to faradic stimulation. Crepitation along the radial groove may be present.

Treatment is surgical. Ideally it consists of primary end to end suture; this, however, may be impossible, necessitating various forms of tenoplasty. Weinberg has had satisfactory results with the use of grafts of dead ox fascia followed by carefully regulated postoperative care. Useful function can be secured only by operation in this unpredictable and therefore unpreventable complication of Colles' fracture.

THOMAS W[illegible], M.D.

Thumb Reconstruction by Transfer of Big Toe

Clarkson, P., and Furlong, R., Brit. M. J. 2: 1332, 1949

This paper is an interim report based on 1 case experience. The patient was a 9 year-old girl who lost all digits after an electric burn at the age of 2 years. After several operations the child was still unable to achieve a proper pickup motion between the thumb stump and the digits. It was decided to graft the big toe into the position of the stump of the thumb. The extensor tendons of the thumb and the transposed hallux were joined. The [illegible] of digital nerves was left for a subsequent operation. The patient has recovered sufficiently to pick up and hold small objects and a pencil or fork, but there [illegible] of the [illegible] between the graft and the host. Healing of both [illegible] and foot [illegible] complete within two weeks. The [illegible] genital absence of all digits, inasmuch as it is believed that no greater surgical difficulty would be encountered in transferring five toes than in transferring one.

Harvey E. Billig, Jr., M.D.

Production of Hypertension and Hyalinosis by Desoxocortisone. Selye, H., Brit. M. J. 1:4647, 1950.

As of Jan. 28, 1950, Selye reports on the production of hypertension in vascular changes following the administration of desoxocortisone acetate. Hypertension, periarteritis nodosa, cardiac nodules, arteritis and nephrosclerosis can be produced by injections of impure anterior pituitary preparations. It is felt that this probably stimulates the production of 11 desoxocortisone, so-called mineralocorticoid; and this series of responses produces lesions characteristic of the so-called diseases of adaptation.

The importance of this research is an aid to understanding of the activities of such compounds as ACTH and cortisone. Injection of the mineralocorticoid in rats produces lesions in the mesenteric arteries, Aschoff-like nodules in the heart, and hyalinization of the smaller brain vessels. The lesions in the mesenteric arteries are similar to those seen in acute types of periarteritis nodosa in man.

The mineralocorticoids are unlike the glucocorticoids (cortisone) and do not produce involution of the lymphatic organs. The data are presented to support the view that naturally occurring corticoids may be involved in the pathogenesis of the diseases of adaptation, the same diseases which appear to respond favorably to treatment with cortisone or ACTH.

M. T. Friedell, M.D.

Perforation and Hematemesis. Ives, L. A., Lancet 1:246, 1950.

In spite of the aphorism that perforated ulcers do not bleed and bleeding ulcers do not perforate, the two complications occasionally occur in close sequence. The 3 cases on which this report is based were observed during a ten-year period at the West Middlesex Hospital; in 2 of them violent hematemesis complicated recovery from closure of an acute perforation. It is noted that uncertainty as to proper treatment is less likely when perforation follows hematemesis than when this sequence is reversed. The most detailed case report records the occurrence of massive hematemesis twenty days after suture of a perforation; thoracic pain and hemoptysis on the tenth day had drawn attention away from the abdomen. The patient died on the thirty-eighth postoperative day, after 46 pints (22.8 L.) of blood had been given. At necropsy it was observed that the ulcer had eroded the splenic artery. In the other case, with the same sequence of complications, massive bleeding occurred on the thirteenth day after closure of the perforation; the condition of the patient worsened in spite of administration of 6 pints (2.8 L.) of blood in the first eighteen hours after bleeding started and subtotal gastrectomy was performed. It was found that the bleeding was from an eroded branch of the right gastric artery. The patient survived. The author concludes that perforation and hematemesis form an uncommon but dangerous combination, that the event may usually be ascribed to an extensive single ulcer or to two separate lesions, and that the best recovery rate is likely to follow immediate partial gastrectomy.

Louis River, M.D.

Thymectomy in Myastenia Gravis. Viets, H. R., Brit. M. J. 1:139, 1950.

In the Neurological Department, Massachusetts General Hospital, 36 patients with myasthenia gravis have been treated by thymectomy from 1941 to August 1949. Of the 36 patients, 7 had thymomas and 29 showed various degrees of involution and the formation of germinal centers in the thymic tissue. Dr. Viets points out that thymectomy is still in the experimental stage, with slight but definite indications, however, that there is some relation between the thymus and myasthenia gravis.

Three of the 7 patients with thymoma are living; 1 has survived six years. Two are greatly improved by the operation and their condition is classed as "excellent"; the condition of 1 is considered "fair."

All but 4 of the twenty-nine patients in the nonneoplastic series have survived.

Thymectomy should never be an "operation of desperation." Patients should be adequately maintained with oral neostigmine before operation and intravenous neostigmine during thymectomy.

Thymomas in general are benign tumors, but they may expand locally. Implants at the time of operation are possible.

The significance of germinal center formation in the thymus is not clear. The presence of a large number of germinal centers, however, is highly suggestive of myasthenia gravis.

The results of thymectomy in the last nine years justify continuation of the operation for patients with myasthenia gravis. The operative mortality should be zero, or nearly that, if patients are carefully selected and adequately maintained during the procedure.

Henry J. Roseyear, M.D.

Armamentarium

Medical Illustrators' Directory The Directory issue of *Graphics,* the official publication of the Association of Medical Illustrators, contains the name, address, training, professional experience and reference to major published work of each member Other information pertaining to the profession is included The journal, to be issued on June first, will be available to those requiring medical illustration service and will be sent free of charge upon request to the Editor Miss Helen Lorraine, 5212 Sylvan Road, Richmond 25 Va

New Rabies Vaccine The development of an entirely new rabies vaccine for dog immunization has been announced by the Lederle Laboratories Division of the American Cyanamid Company Pearl River, New York Described by the company as the "most important step taken toward the elimination of rabies as a fatal disease since the work done by Pasteur," the new vaccine has been tested successfully on more than 12 000 dogs It will be made available to veterinarians and to the sanitary and public health officials throughout the country

The new vaccine is produced from live virus which has been modified by growth in chick embryos It is completely modified and does not contain mammalian brain or spinal cord tissue

New Treatment for Amebiasis With a warning that "one in 10 patients may have intestinal amebiasis," practicing physicians have been advised of a new treatment for the disease

The new preparation is called Milibis It is an organic bismuth compound and is described by Dr J B Rice, director of medical research for Winthrop Stearns Inc, as "more powerful than the amebacides heretofore available and yet of such low toxicity that side effects from its use are very rare It is claimed that Milibis has produced clinical and laboratory cures of intestinal amebiasis in over 80 per cent of cases after administration in from one to four courses of 0 5 Gm in tablets three times daily for seven days each

Milibis was developed by the Sterling Winthrop Research Institute of Rensselaer N Y

Urographic Contrast Medium Mallinckrodt Chemical Works St Louis announces that its new contrast medium for urography, sterile solution Urokon Sodium 30%, will be available to the medical profession on May 1 This new compound has undergone thorough clinical testing at various institutions, including the medical schools of the University of Michigan and Washington University According to the distributors results in more than 5 000 cases indicate that Urokon produces fewer side reactions and better and quicker pyelograms than other mediums now in use

Penicillin Inhalator Sharp & Dohme, Inc of Philadelphia, announce the national release of Penaire' Penicillin Inhalator, an effective method of penicillin powder inhalation The inhalator is small compact, and easy to use either in the physician's office or at home The same compact unit may be used for oral or nasal inhalation without separate attachments and is disposable after each day of treatment The 'Penaire penicillin capsules supplied with the inhalator contain 100,000 units of finely divided crystalline sodium penicillin G powder, which is stable in the dry form for a prolonged period

Inhalation of penicillin powder by means of the Penaire' Inhalator may be used in the treatment of certain infections of the respiratory tracts due to penicillin sensitive organisms and amenable to inhalation therapy These infections include acute and chronic sinusitis, pulmonary abscess, oropharyngitis nasopharyngitis, pharyngitis, eustachitis, laryngitis tracheitis tracheobronchitis, bronchitis and bronchiectasis

Bacitracin Oral Tablets C S C A new, highly successful means of treating intestinal amebiasis is now available to the physician, according to the Medical Director of C S C Pharmaceuticals, a division of Commercial Solvents Corporation, New York

This method employs oral administration of bacitracin, the antibiotic isolated by Meleney and Johnson of Columbia University The significant feature is the rapidity with which symptoms are brought under control, bowel movements are said to be normalized in most cases in thirty six to forty eight hours 'By the end of the two week course of treatment, all evidence of the infestation usually disappears Bacitracin is not appreciably absorbed from the intestinal tract, hence high concentrations are built up in the intestinal contents where the antibiotic acts directly on the ameba or other intestinal organisms existing symbiotically with E histolytica"

For clinical use, bacitracin is available as Bacitracin Oral Tablets C S C Each tablet contains 10,000 units, [illegible] average dose in cases of amebiasis [illegible] ts daily

In Memoriam

ELDRIDGE LYON ELIASON

M.D., F.A.C.S., F.I.C.S.

Dr. Eldridge Lyon Eliason of Philadelphia, author of numerous books on surgery and medicine, died recently at the age of 70. A graduate of the Hotchkiss School, Yale University and the University of Pennsylvania Medical School, Dr. Eliason was a member of the staff of the University of Pennsylvania Hospital from 1905 until the time of his death. In addition, he was affiliated with the Philadelphia General Hospital, the Presbyterian Hospital and the Delaware County Hospital from 1927 to 1936 and with Mt. Sinai Hospital from 1930 to 1936. He taught at the University of Pennsylvania Medical School from 1907 to 1936 and was the John Rhea Barton Professor Emeritus. Dr. Eliason was a member of the American Medical Association, the American College of Surgeons, the International College of Surgeons, the American Surgical Association, the Philadelphia Academy of Surgery and the American Board of Surgery.

GIDEON M. VAN POOLE

M.D., F.A.C.S., F.I.C.S.

Dr. Gideon M. Van Poole of Honolulu, Hawaii, passed away on April 12 of this year. Dr. Van Poole, who received his medical degree at the University of Maryland in 1899, pursued a distinguished career as an Army surgeon for twenty years (1900-1920), *and was retired for disability* in the line of duty in 1920. In Hawaii he served as an active member of the staffs of Queen's Hospital, St. Francis Hospital, Children's Hospital, Leahi Hospital, Kahili Hospital (leprosy), Kuahini Hospital, Kenehoa Hospital (mental disease) and Kapiolai Hospital (maternity). He was a member of the American Medical Association, the American College of Surgeons, the International College of Surgeons, the Academy of Otology and Otolaryngology, the American Ophthalmological Society, the Association for Research in Ophthalmology and the American Broncho-Esophagological Society. He was also a member and past president of the Hawaii Territorial Medical Association and of the Honolulu County Medical Society, as well as a life member and past president of the American Medical Association of Vienna, in which city some part of his postgraduate studies took place. Dr. Van Poole was certified by the American Board of Ophthalmology in 1925 and by the American Board of Otolaryngology in 1931.

ALVIN FERNANDO SETHER

M.D., F.A.C.S., F.I.C.S.

Dr. Alvin Fernando Sether of Eugene, Oregon, died early in March 1950. Dr. Sether, a graduate of the University of Chicago and Rush Medical School, served his internship in the Norwegian American Hospital in Chicago and St. Mary's Hospital in Oshkosh, Wisconsin. Settling in Oregon, he was Chief Surgeon at Mercy Hospital, Roseburg, from 1908 to 1924; at the time of his death he was *Chief of the Surgical Division of the Sacred* Heart Hospital in Eugene. Dr. Van Poole was a member of the American Medical Association, the American College of Surgeons, the International College of Surgeons, the Oregon State and Lane County Medical Societies and the Portland Academy of Medicine.

CHARLES RICHARD DREW

M.D., F.I.C.S.

On April 1, 1950, Dr. Charles Richard Drew of Washington, D.C., Professor and Head of the Department of Surgery, Howard University, passed away. Dr. Drew's medical education was obtained in Canada; having received his medical degree at McGill in 1933, he became an intern at Montreal General Hospital. As a Fellow of the Rockefeller Foundation in Surgery, he pursued postgraduate studies from 1938 to 1940. At the Freedmen's Hospital he was Chief Surgeon from 1941 and Chief of Staff from 1942. His untimely death cut short a career permeated with the keenest interest in the encouragement and advancement of young Negro surgeons. Dr. Drew was a member of the National Medical Association, the International College of Surgeons and the American Board of Surgery.

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